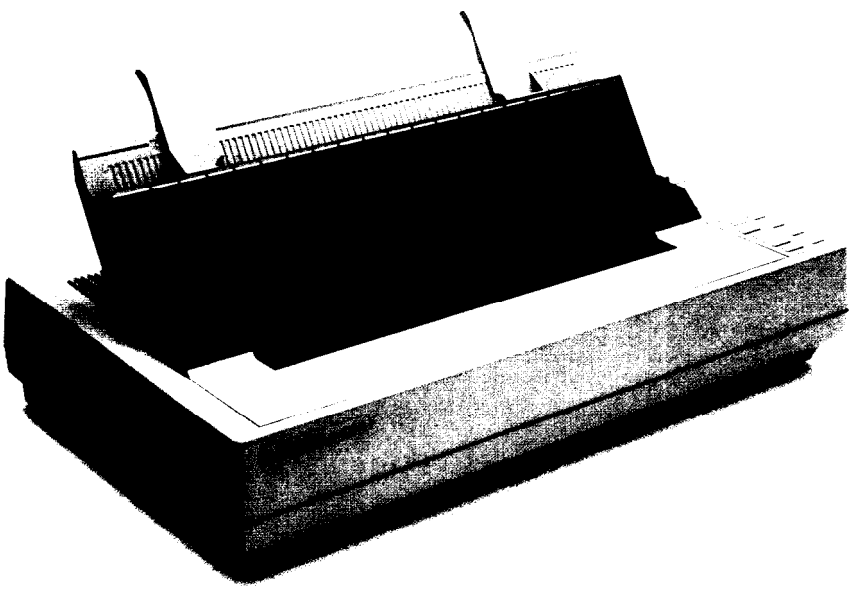
User's Manual



EPSON®

4000269
S01-00

LQ-850/1050

User's Manual

FCC COMPLIANCE STATEMENT FOR AMERICAN USERS

This equipment has been tested and found to comply with the limits for a class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio or television reception. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause interference to radio and television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- **Reorient or relocate the receiving antenna**
- **Increase the separation between the equipment and receiver**
- **Connect the equipment into an outlet on a circuit different from that to which the receiver is connected**
- **Consult the dealer or an experienced radio/TV technician for help.**

WARNING

The connection of a non-shielded equipment interface cable to this equipment will invalidate the FCC Certification of this device and may cause interference levels which exceed the limits established by the FCC for this equipment. It is the responsibility of the user to obtain and use a shielded equipment interface cable with this device. If this equipment has more than one interface connector, do not leave cables connected to unused interfaces.

Changes or modifications not expressly approved by Epson America, Inc., could void the user's authority to operate the equipment.

FOR CANADIAN USERS

This digital apparatus does not exceed the Class B limits for radio noise emissions from digital apparatus as set out in the radio interference regulations of the Canadian Department of Communications.

Le present appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numéiques de Classe B prescrites dans le réglement sur le brouillage radioélectriques édicté par le Ministére des Communications du Canada.

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General Notice: Other product names used herein are for identification purposes only and may be trademarks of their respective companies.

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IMPORTANT SAFETY INSTRUCTIONS

1. Read all of these instructions and save them for later reference.
2. Follow all warnings and instructions marked on the product.
3. Unplug this product from the wall outlet before cleaning. Do not use liquid cleaners or aerosol cleaners. Use a damp cloth for cleaning the outside of the unit.
4. Do not use this product near water.
5. Do not place this product on an unstable cart, stand, or table. The product may fall, causing serious damage to the product.
6. Slots and openings in the cabinet and the back or bottom are provided for ventilation; to ensure reliable operation of the product and to protect it from overheating, these openings must not be blocked or covered. The openings should never be blocked by placing the product on a bed, sofa, rug, or other similar surface. This product should never be placed near or over a radiator or heat register. This product should not be placed in a built in installation unless proper ventilation is provided.
7. This product should be operated from the type of power source indicated on the marking label. If you are not sure of the type of power available, consult your dealer or local power company.
8. This product is equipped with a 3-wire grounding-type plug, a plug having a third (grounding) pin. This plug will only fit into a grounding type power outlet. This is a safety feature. If you are unable to insert the plug into the outlet, contact your electrician to replace your obsolete outlet. Do not defeat the purpose of the grounding type plug.
9. Do not locate this product where the cord will be walked on.

10. If an extension cord is used with this product, make sure that the total of the ampere ratings on the products plugged into the extension cord do not exceed the extension cord ampere rating. Also, make sure that the total of all products plugged into the wall outlet does not exceed 15 amperes.

11. Never push objects of any kind into this product through cabinet slots, as they may touch dangerous voltage points or short out parts that could result in a risk of fire or electric shock. Never spill liquid of any kind on the product.

12. Except as specifically explained in the User's Manual, do not attempt to service this product yourself. Opening or removing those covers that are marked "Do Not Remove" may expose you to dangerous voltage points or other risks. Refer all servicing in those compartments to service personnel.

13. Unplug this product from the wall outlet and refer servicing to qualified service personnel under the following conditions:

    A. When the power cord or plug is damaged or frayed.

    B. If liquid has been spilled into the product.

    C. If the product has been exposed to rain or water.

    D. If the product does not operate normally when the operating instructions are followed. Adjust only those controls that are covered by the operating instructions, since improper adjustment of other controls may result in damage and will often require extensive work by a qualified technician to restore the product to normal operation.

    E. If the product has been dropped or the cabinet has been damaged.

    F. If the product exhibits a distinct change in performance, indicating a need for service.

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Introduction

The Epson® LQ-850 and LQ-1050 are advanced 24-pin impact dot matrix printers, combining high performance and reliability with a wide range of features.

Features

In addition to the high-quality printing and ease of operation you have come to expect from Epson printers, the LQ-850 and LQ-1050 offer the following features:

- Easy paper handling, featuring automatic single-sheet loading.
- Compatibility with the Epson ESC/P® commands used by the LQ-500, LQ-510, LQ-800, LQ-1000, LQ-1500, LQ-2500, and LQ-2550.
- Fast draft printing of up to 300 characters per second at 10 characters per inch (cpi) in Super Draft mode, and 295 characters per second at 12 cpi or 246 characters per second at 10 cpi in normal draft mode.
- An improved control panel design that allows direct selection of many of the printer's main features including character fonts and character spacing, as well as a choice of normal or condensed printing.
- The SmartPark™ paper handling system that lets you use single sheets of paper without removing the continuous paper, eliminates paper waste with short tear-off, and allows easy and accurate paper alignment.
- Nine built-in Letter Quality fonts for producing high-quality documents:

  Epson Roman, Epson Sans Serif, Epson Courier, Epson Prestige, OCR-B, OCR-A, Epson Script, Epson Orator, Epson Orator-S.

- A 360 x 360 dot per inch graphics mode.

- A micro-adjustment feature that allows you to feed the paper forward or backward in 1/180-inch increments to finely adjust the loading and short tear-off positions.
- An auto-load feature lets you load a single sheet of paper automatically when not using the optional cut sheet feeder.
- The Epson Extended Graphics character table, 14 international character sets, a legal symbol set, and an italic character table.
- The ability to handle a wide range of paper types, including envelopes and labels.

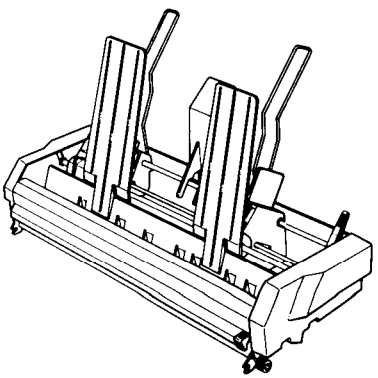
Options

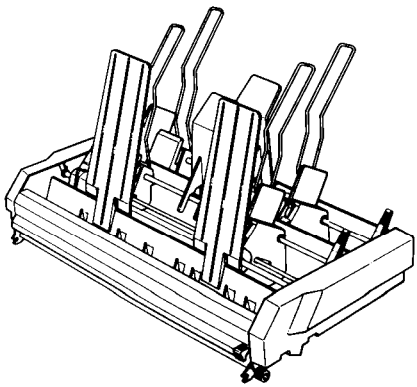
A variety of printer options is available for use with your printer. For detailed information on using these options, see Chapter 5.

To locate or purchase options or supplies, call Epson Accessories, Inc. at 1800-873-7766.

- Single-bin and Double-bin Cut Sheet Feeders (#7339/#7340/#7346/#7348)

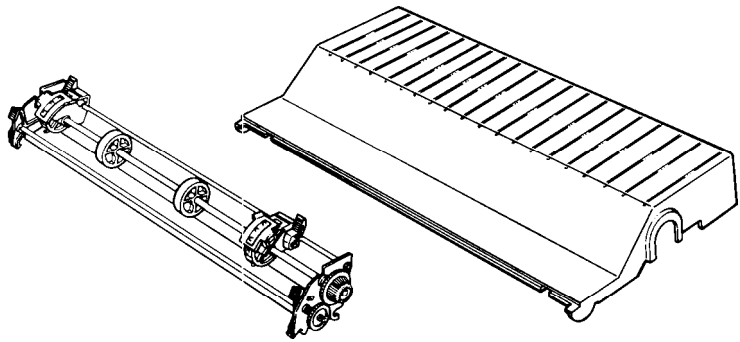
  The cut sheet feeders make it possible to handle single-sheet paper and envelopes more easily and more efficiently. Up to 150 sheets of standard bond paper can be automatically fed into the printer without reloading.





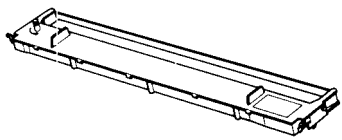
- Pull Tractor Unit (#7311/#7312)

  This option improves the performance of continuous paper handling. It is especially useful with continuous multi-part forms.



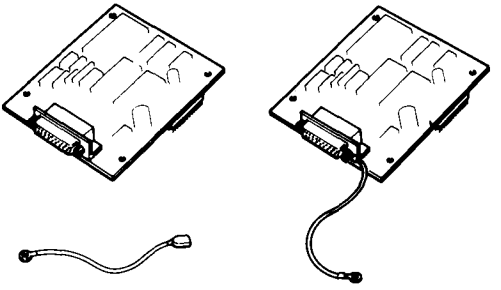
- Film Ribbon Cartridge (#7768/#7770)

  The optional film ribbon cartridge provides you with even higher quality printing than the standard fabric ribbon.



- Interface Boards

  Optional interface boards are available to supplement the printer's built-in parallel and serial interfaces. Guidelines for choosing the right interface and instructions on installing the boards are given in Chapter 5.



About This Manual

This user's manual provides fully illustrated, step-by-step instructions on setting up and operating your Epson printer.

Finding your way around

- Chapter 1 contains information on unpacking, setting up, testing, and connecting the printer. Be sure to read and follow these instructions first. Inside the back flap of this manual are illustrations of the printer in which all of the major parts are identified.
- Chapters 2 and 3 cover paper handling and general printer operation. This important information is necessary for the day-today operation of your printer.

- Chapter 4 shows you how to get the most from your printer. It includes advice on the use of software commands and graphics, and creating your own user-defined characters. See Chapter 9 for a useful summary of printer commands.
- If the printer does not operate properly or the printed results are not what you expect, see Chapter 7 for troubleshooting instructions.
- Other chapters and the appendix contain information on printer options, general maintenance, and specifications. You will also find a glossary of printer terms.
- At the back of this manual is a handy Quick Reference card that contains the information you are most likely to need.

Note: The LQ-850 and LQ-1050 are basically the same printer except for their widths. Therefore, the illustrations in this guide show only the LQ-1050.

Conventions used in this manual

WARNINGS must be followed carefully to avoid damage to your printer and computer.

CAUTIONS should be followed carefully to ensure that your printer operates correctly.

Notes contain important information and useful tips on the operation of your printer.

Where to Get Help

A network of authorized Epson dealers and Customer Care Centers throughout the United States offers customer support and service for Epson products. Epson America provides product information and support to its dealers and Customer Care Centers.

Therefore, we ask that you contact the business where you purchased your Epson product to request assistance. If the people there do not have the answer to your question, they can obtain it through our dealer support program.

Epson is confident that this policy will provide you with the assistance you need. Call the Epson Consumer Information Center at 1213-782-2600 for the following:

- The location of the nearest Epson dealer.
- The location of the nearest Customer Care Center.

To locate or purchase accessories or supplies, contact your Epson dealer.

Chapter 1
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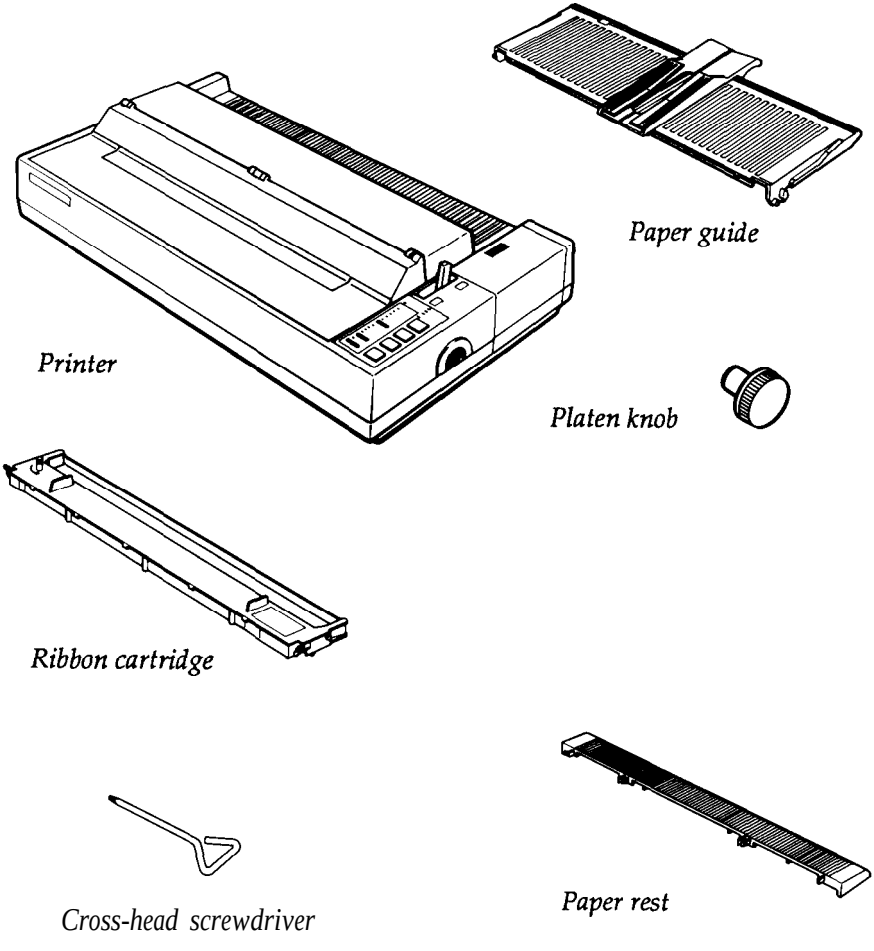
Unpacking the Printer

Checking the Parts

When you unpack the printer, make sure that you have all the parts shown below and that none have been damaged.



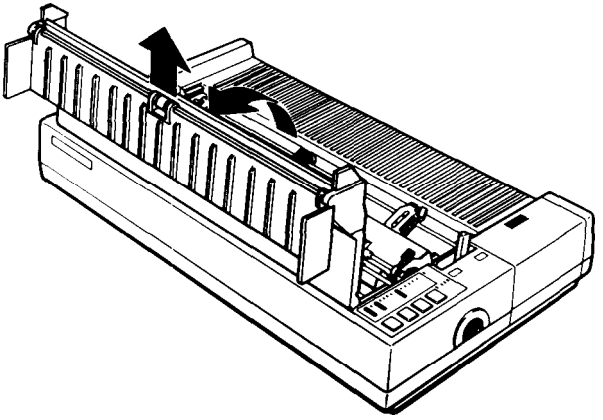
After removing the parts, save the packing materials in case you ever need to transport your printer.

The ribbon cartridge that comes with the LQ-850 is #7753; #7754 comes with the LQ-1050.

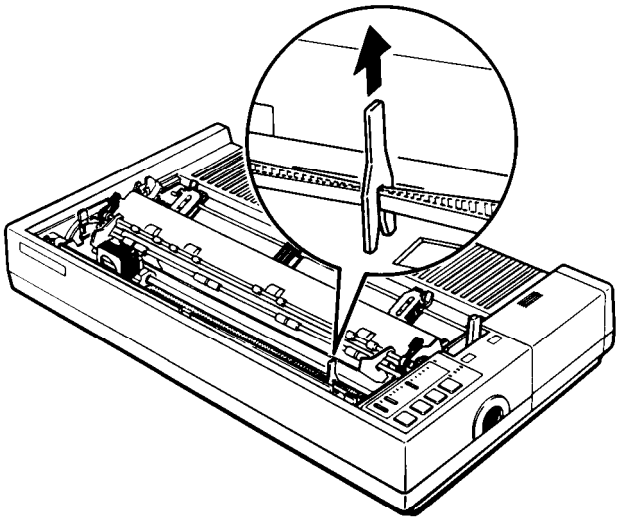
Removing the Protective Materials

The printer is protected during shipping by two locking brackets, two locking tabs, and a print head protector. These protective items must be removed before you turn on the printer. After removing these items, store them with the other packing material in case you ever need to transport your printer.

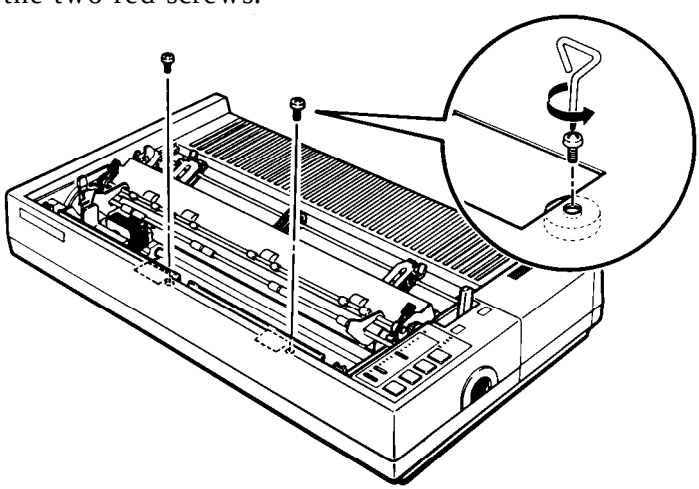
1. Remove the printer cover unit, which includes the printer cover and the paper guide cover.



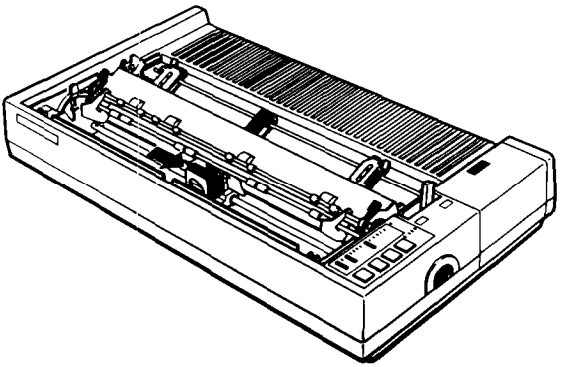
2. Remove any pieces of white packing material you find inside the printer.
3. Remove the print head protector.



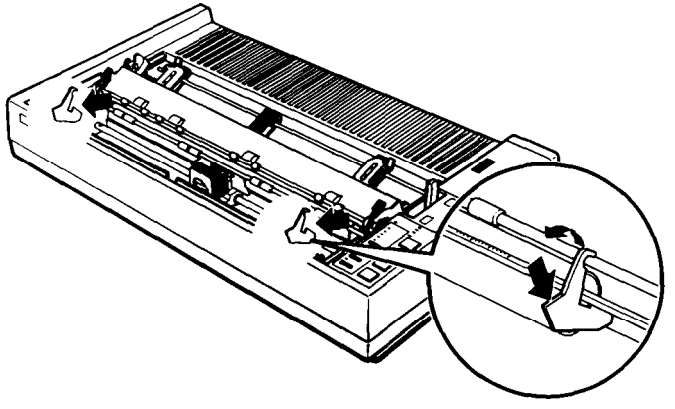
4. Use the cross-head screwdriver that came with the printer to remove the two red screws.



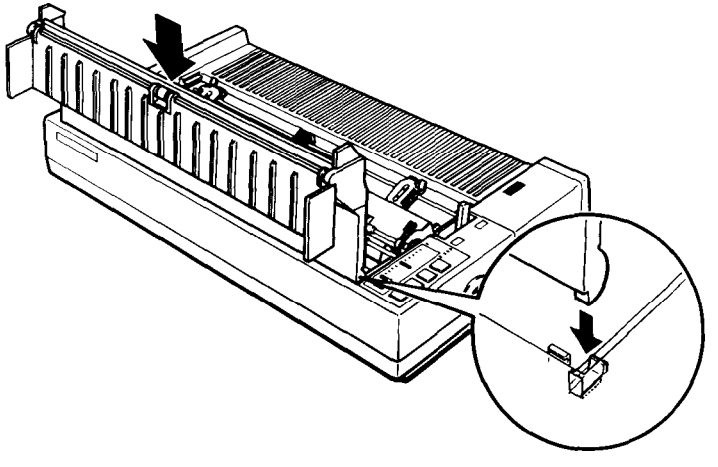
5. Slide the print head to the middle of the printer.



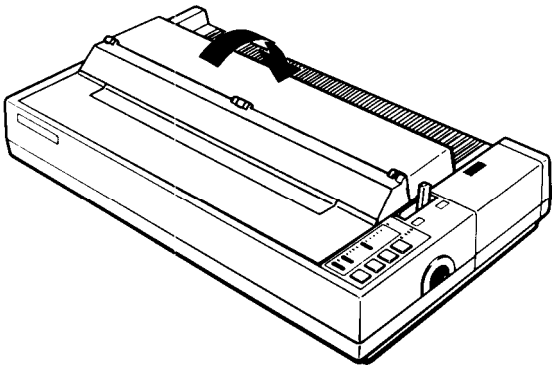
6. Remove the left and right locking tabs.



7. Attach the printer cover unit.



8. Close the paper guide cover.



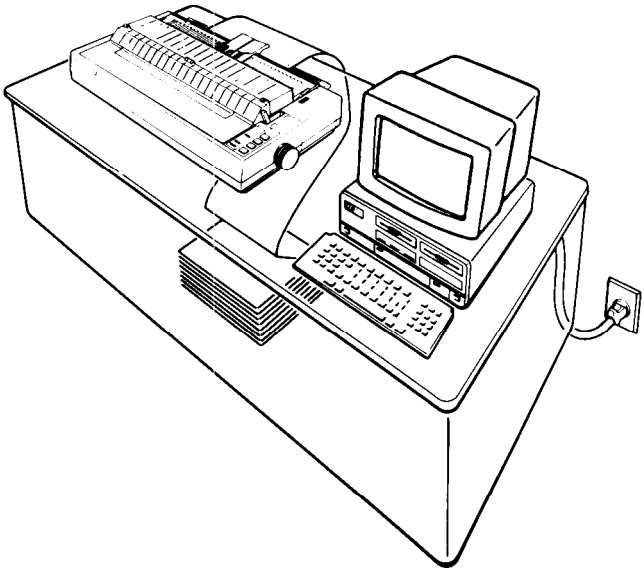
WARNING: Be sure to remove all protective materials before you turn on the printer.

Choosing a Place for the Printer

There are several important things to consider when selecting a place to set up your printer. Keep the following in mind:

- Place the printer on a flat, hard, stable surface. A soft surface, such as a padded counter or carpeted area, will block the ventilation slots and may cause overheating.
- Place the printer close enough to the computer for the printer cable to reach.
- Leave adequate room around the printer to allow for easy printer operation and maintenance, and for unrestricted flow of air around the printer.
- Use a grounded outlet; do not use an adapter plug.
- Avoid locations that are subject to direct sunlight, excessive heat, moisture, or dust.
- Avoid electrical outlets controlled by wall switches or automatic timers. Accidental interruption of power can wipe out information in both your computer's memory and in your printer's memory.
- Avoid using outlets that share a circuit with large motors or electrical appliances; this could cause fluctuations in line voltage.
- Keep the entire computer system away from potential sources of electromagnetic interference such as loudspeakers or the base units of cordless telephones.

The illustration below shows a good printer arrangement.



Note: Before using a printer stand, read these requirements and suggestions.

- The stand should be able to support at least twice the weight of the printer.
- Never use a stand that supports the printer at an angle of more than 15 degrees from horizontal.
- With a cut sheet feeder, your printer must be kept level.
- If your paper supply is positioned below the printer stand, make sure there is enough clearance to keep the paper from catching on the underside of the stand. Also, make sure the distance between the stand supports is wide enough for the paper you are using.
- Position your printer's cables so that they do not interfere with paper feeding. If possible, secure the cables to the printer stand.

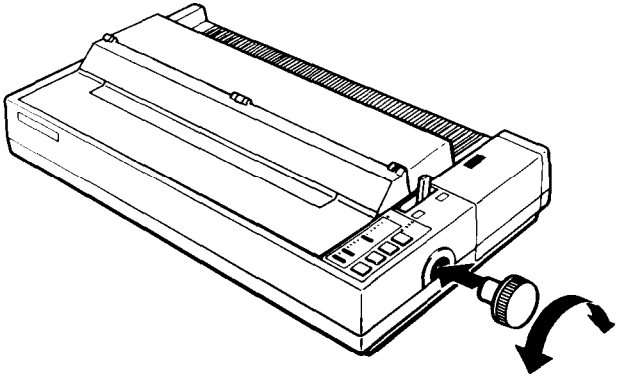
Assembling the Printer

After you've decided on the best place to set up your printer, the next step is to install the platen knob.

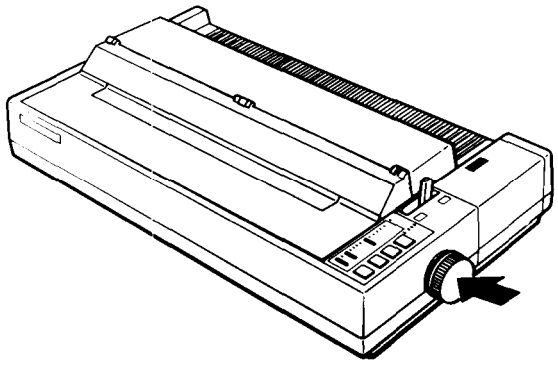
Installing the Platen Knob

You use the platen knob to feed the paper manually in the event of a paper jam or other paper feeding problem. The platen knob is packed in an indentation in the printer's white foam packing material.

1. Insert the platen knob into the hole on the printer's side and rotate it slowly until it slips onto the shaft.



2. Push firmly on the platen knob until it fits against the printer case.



CAUTION: Do not use the platen knob to adjust the position of the paper. This interferes with the automatic paper loading system and may cause **a** paper jam.

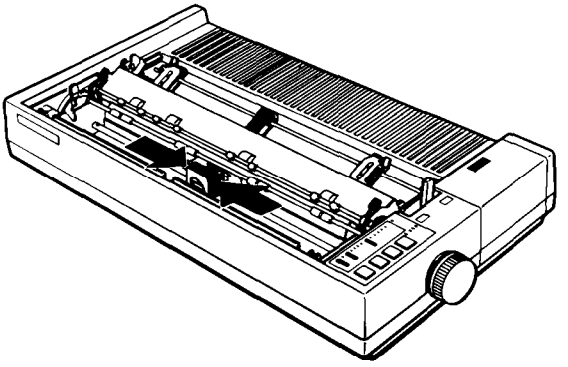
Installing the Ribbon Cartridge

Your printer's ribbon cartridges are designed for easy installation and removal. You install. the standard ribbon cartridge and the optional film ribbon cartridge in the same way. A standard ribbon cartridge comes with your printer.

Install the ribbon cartridge as follows:

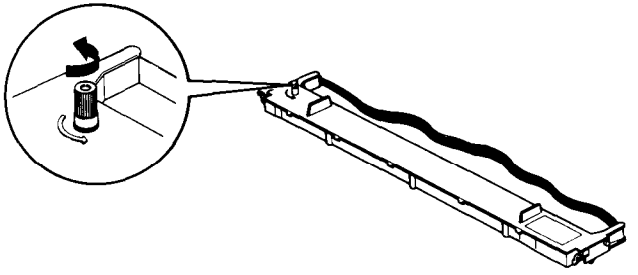
1. Make sure the printer is turned off.
2. Remove the printer cover unit.

3. Slide the print head to the middle of the printer.

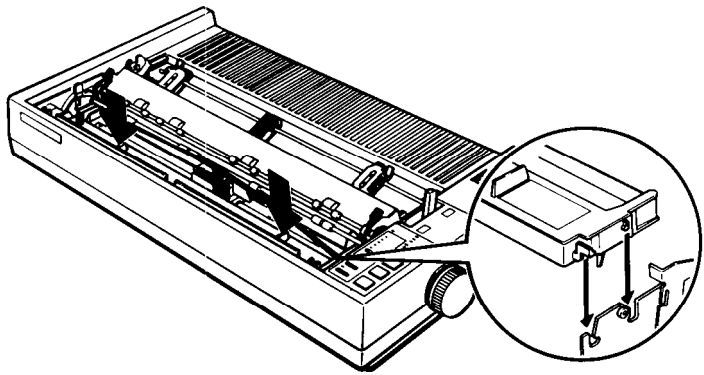


CAUTION: Never move the print head while the printer is turned on because this can damage the printer. Also, if you have been using the printer, the print head may be hot; let it cool for a few minutes before touching it.

4. Turn the ribbon-tightening knob in the direction of the arrow. This removes slack in the ribbon and makes it easier to install.

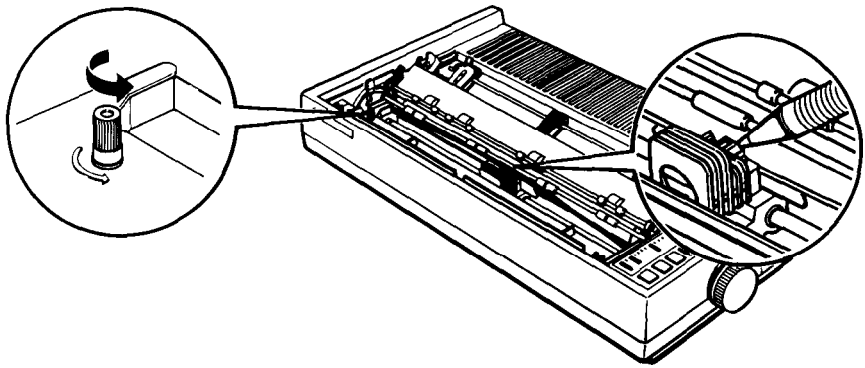


5. Hold the ribbon cartridge by its black, fin-like handles with the exposed ribbon away from you. (The LQ-850 ribbon cartridge has only one handle.) Push the cartridge firmly into position, making sure the plastic hooks fit into the slots inside the printer.

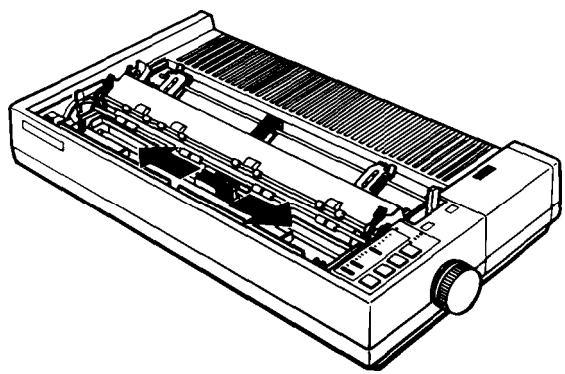


Note: Press lightly on both ends of the cartridge to make sure the plastic hooks are properly seated.

6. Use a pointed object, such as a ballpoint pen, to guide the ribbon between the print head and ribbon guide while you turn the ribbon-tightening knob to help feed the ribbon into place.



7. Slide the print head from side to side to make sure it moves smoothly. Also check that the ribbon is not twisted or creased.



Make sure the paper thickness lever on the left is set to position 2. See The Paper Thickness Lever in Chapter 2 if you are printing on special paper.

CAUTION: Film ribbon cartridges must be used and stored within the following temperature ranges:

Operation: 41°F to 95°F (5°C to 35°C)

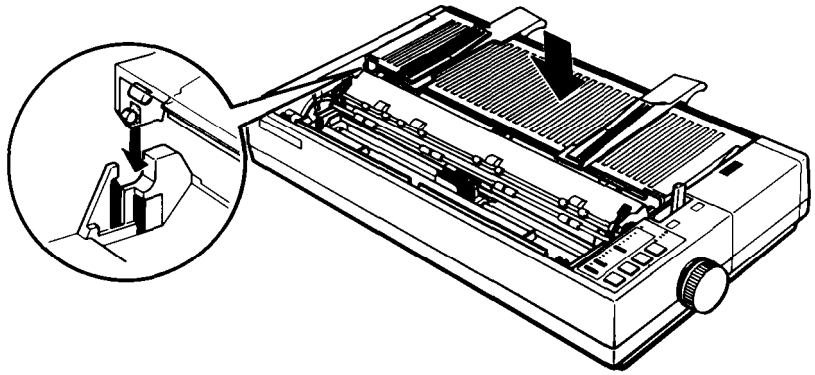
Storage: -22°F to 104°F (-30°C to 40°C)

Storing and using **a** film ribbon at high temperatures shortens the ribbon's life expectancy, which is normally 200,000 **characters (#7768)** or 300,000 **characters (#7770).** If you continue to use the ribbon beyond its life expectancy, printing suddenly becomes faint and the ribbon may snap.

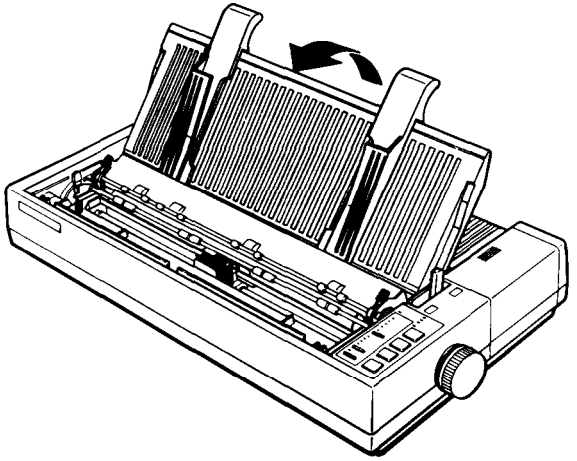
Attaching the Paper Guide

When you use single sheets, the paper guide helps to feed the paper smoothly and efficiently into the printer. Attach the paper guide using the following procedure.

1. Place the paper guide on the printer as shown below. Make sure the back edge of the guide is even with the back of the printer.

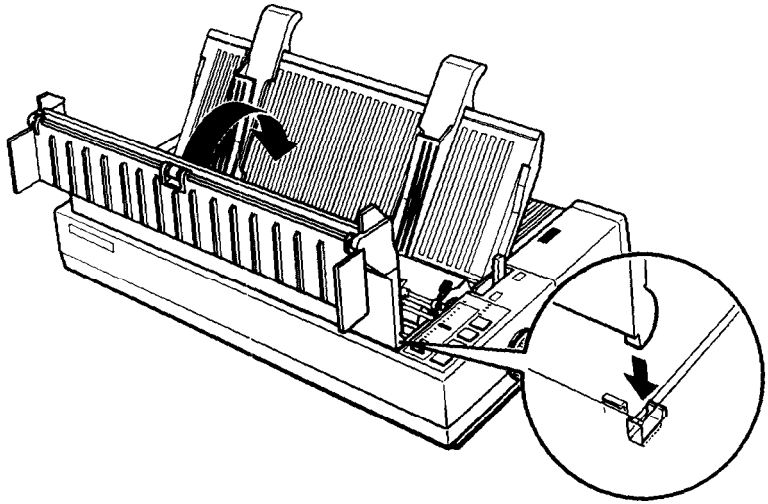


2. Raise the paper guide until it locks into place.

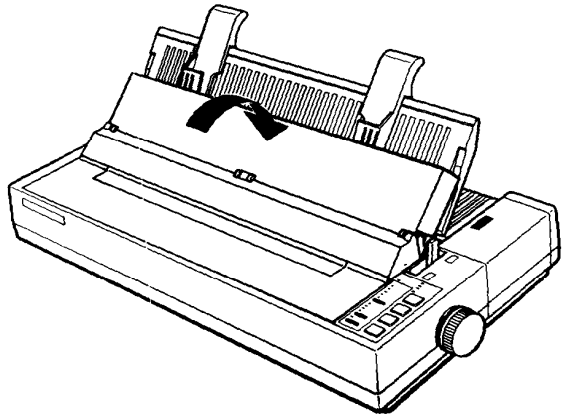


Note: To lower the paper guide, lift up slightly to release it from its locked position; then gently lower it down onto the printer.

3. Attach the printer cover by fitting the hooks on the cover into the notches at the front of the printer and tilting the cover back into place.



4. Close the paper guide cover.



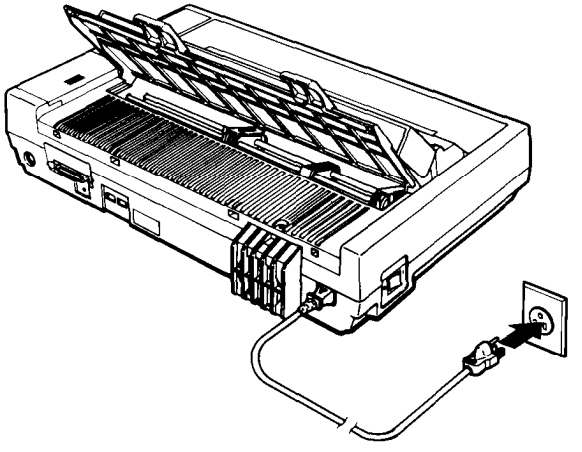
Testing the Printer

Now that your printer is fully assembled, you can use its built-in self test function to see that the printer is working correctly before you connect it to a computer. You should perform this test to make sure that your printer was not damaged during shipping and that the ribbon is correctly installed.

Before running the self test, you need to connect the printer to an electrical outlet and load a sheet of paper.

Plugging in the Printer

1. Make sure that the printer is turned off.
2. Plug the power cable into a properly grounded electrical outlet.



Running the Self Test

The self test prints out the settings of the printers DIP switches and the characters in the printer's memory. The test can be run in either SuperDraft, normal draft, or Letter Quality (LQ) mode.

You select the draft mode or Letter Quality mode, depending on which button you hold down as you turn on the printer. You choose between the SuperDraft and the normal draft mode by changing your printer's DIP switch settings. Your printers default setting is SuperDraft mode. To run the test in normal draft mode, see Setting the DIP Switches in Chapter 3 before following the steps below.

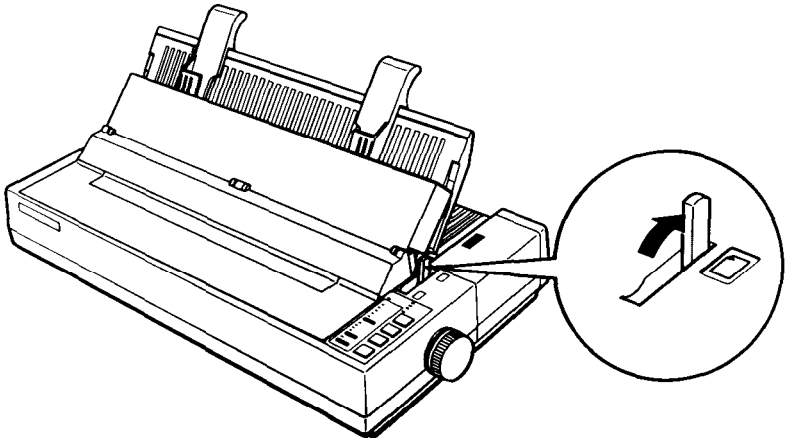
The self test is 8 inches wide on the LQ-850 and 14 inches wide on the LQ-1050.

CAUTION: Never run the self test using paper that is narrower than 8.27 inches (210 mm) on the LQ-850 or 14 inches (360 mm) on the LQ-1050. This prevents the print head from printing directly onto the platen, which can damage the print head.

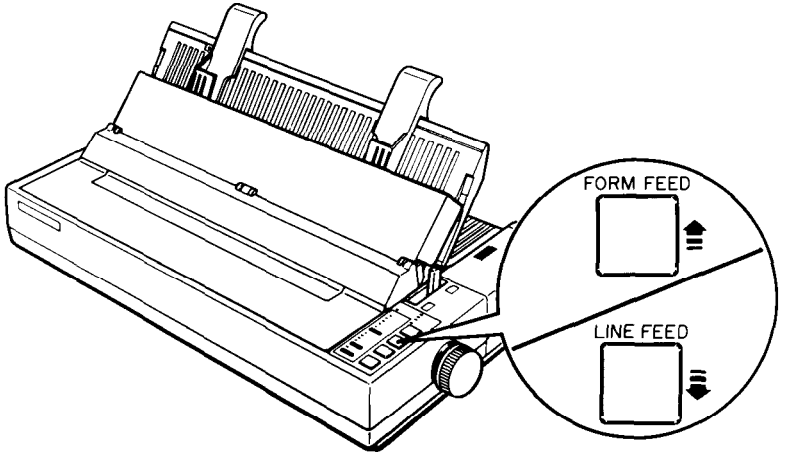
Although the self test **can** be run with continuous paper, use single-sheet paper now because single-sheet loading is easier. Be sure to use paper that is wide enough for the self test to print. If you need to load continuous paper to print the self test, see Loading Continuous Paper in Chapter 3.

1. Make sure the printer is turned off.

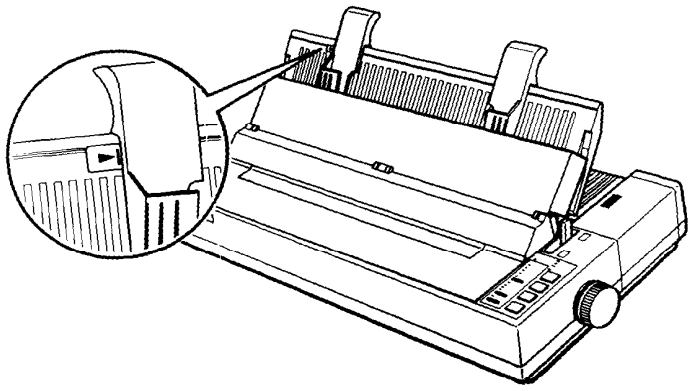
2. Push the paper release lever back to the single-sheet position.



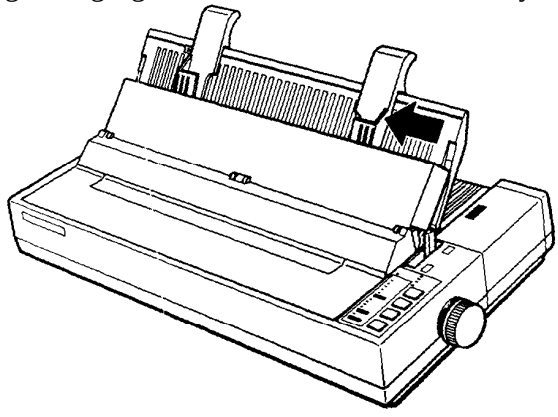
3. While holding down the LINE FEED button (draft mode) or FORM FEED button (Letter Quality mode), turn on the printer. The printer beeps several times and the POWER and PAPER OUT lights come on.



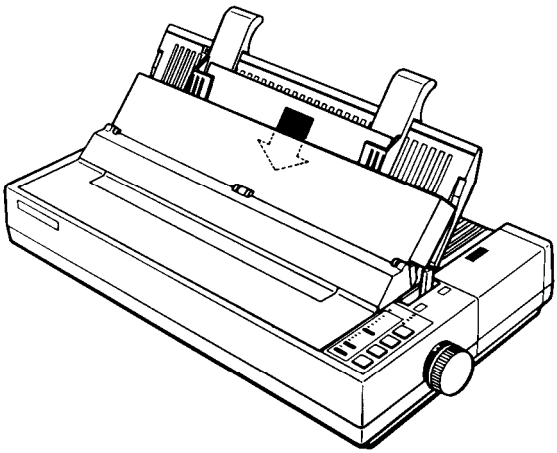
4. Move the left edge guide to the right or left until it rests against the triangular guide mark on the paper guide



5. Adjust the right edge guide to match the width of your paper.

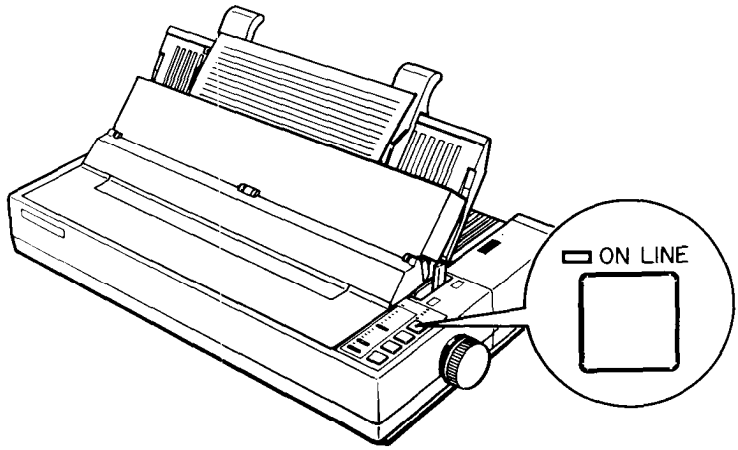


6. Next, slide a sheet of paper down between the edge guides until it meets resistance. After about two seconds, the printer loads the paper automatically and then starts the self test.



A list of DIP switch settings is printed first, followed by a series of characters. The self test continues until the paper runs out or until you press the ON LINE button.

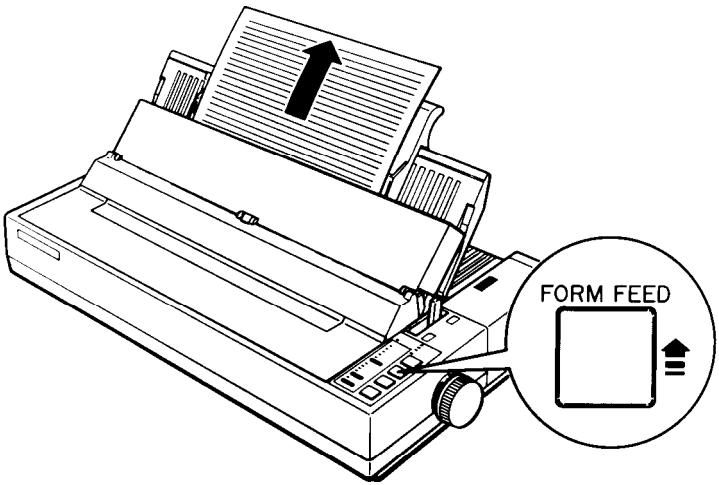
7. When you wish to stop the test, press the ON LINE button.



If the test results are not satisfactory, see Solving Any Self Test Problems later in this chapter for possible causes and solutions.

Note: To resume the test, press the ON LINE button once more.

8. To end the self test, press the FORM FEED button to eject any paper that is still loaded. Then turn off the printer.

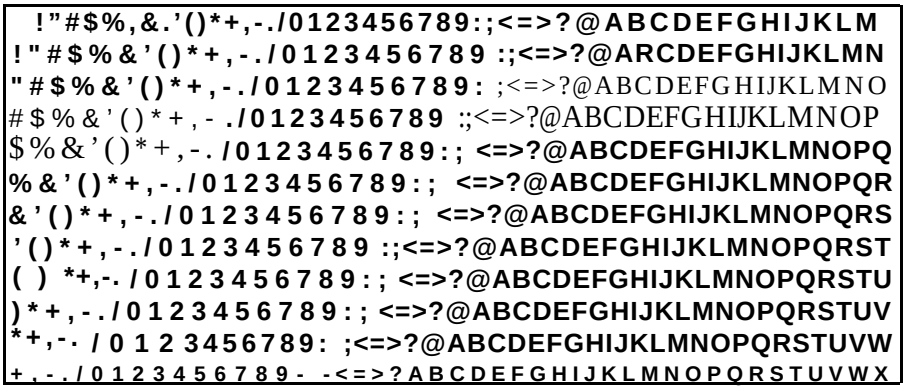


WARNING: After turning the power off, always wait at least five seconds before turning it back on. Turning the power on and off rapidly can damage the printer.

Here are parts of typical self tests.

Normal draft mode

SuperDraft mode



Letter Quality mode

Note: When using the optional cut sheet feeder, the first page of the self test printout is slightly different. For details, see The Cut Sheet Feeder in Chapter 5.

Solving Any Self Test Problems

If the self test does not print properly, check the control panel and the print head area. If paper is jammed, turn off the printer. Then remove the paper using the platen knob and load a new sheet. See that all packing material and shipping restraints have been removed from inside the printer. (You can also see Chapter 7 for further information.)

Problem	**Solution**
The printer does not print.	
The printer sounds like it is printing, but nothing is printed.	The ribbon may not be installed properly. Turn off the printer, reinstall the ribbon cartridge, and then tighten the ribbon by turning the ribbon-tightening knob. Make sure the ribbon passes between the print head and ribbon guide. The ribbon may be worn. Replace the ribbon cartridge. See Replacing the Ribbon in Chapter 6.
The test did not print.	Turn off the printer and repeat the self test. Make sure you hold down the FORM FEED or LINE FEED button the entire time you are turning on the printer. Turn off the printer and disconnect the cable from the host computer. Try the self test again. If the printer still does not print the self test correctly, contact your Epson dealer or Epson authorized service center.

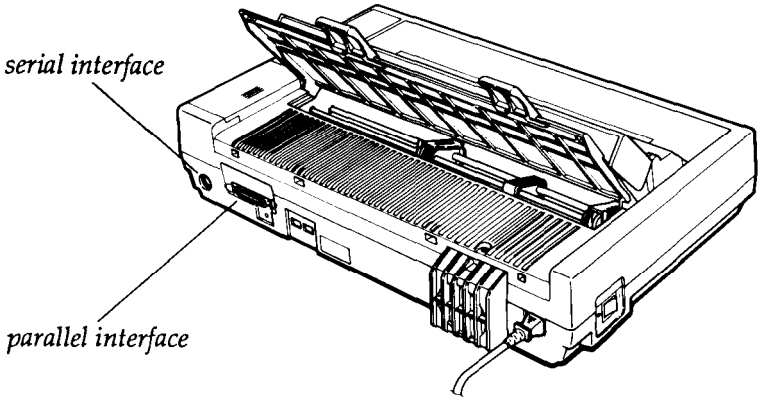
Problem	Solution
The print is faint or uneven.	
Printed characters have part missing at *the bottom as shown here.* 	The ribbon cartridge may not be properly installed. Remove the ribbon cartridge and reinstall it; make sure the cartridge hooks are inserted securely into the printer.
The printout is faint.	The ribbon may be worn out. A worn ribbon can damage the print head and should be replaced. Install a new ribbon cartridge as soon as possible. See Replacing the Ribbon in Chapter 6. The paper thickness lever may not be set correctly for the paper you are using. Set the paper thickness lever to match the thickness of your paper. See The Paper Thickness Lever in Chapter 2.
Dots are missing in the printed characters or graphics.	
A line of dots is missing in the printout. 	The print head is damaged. Stop printing and contact your Epson dealer to have the print head replaced.

Problem	Solution
Dots are missing in the printed characters or graphics. (continued)	
Dots are missing in random positions. 	There is either too much slack in the ribbon or the ribbon has come loose and caught on something. Stop printing, turn off the printer, and reinstall the ribbon cartridge.

If the printer still does not print the self test correctly, contact your Epson dealer.

Connecting the Printer to Your Computer

Your printer has two separate interface connections: a parallel interface and an RS-232C compatible serial interface. If you are not sure which one is required by your computer, check your computer manual for this information.



If you have a suitable shielded cable, you should be able to connect to most computers immediately. If you have one of the few computers that require a different type of interface, you need to install an optional interface board. See The Interface Boards in Chapter 5.

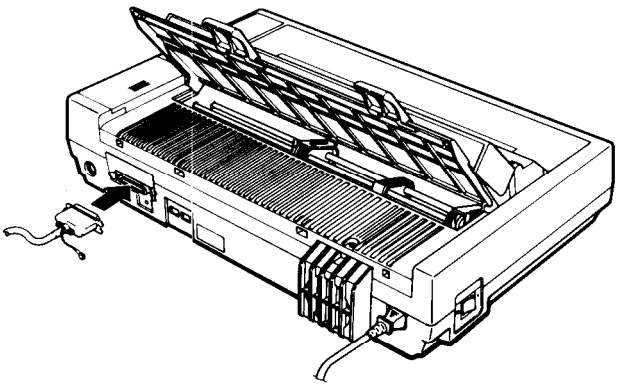
The parallel interface is the printer's default setting. If you need to use the built-in serial interface, be sure to change the DIP switch setting as shown in Chapter 3.

WARNING: Do not plug more than one interface cable into the printer at one time. This may damage the printer.

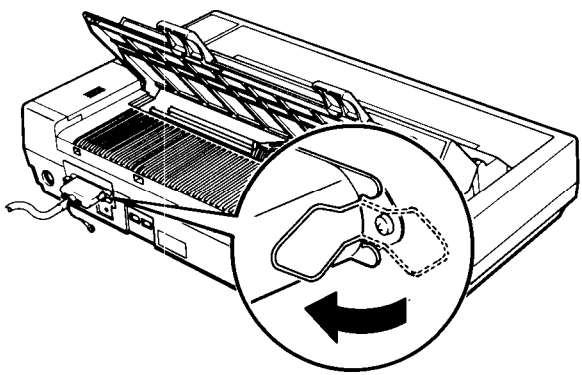
The Parallel Interface

Connect the parallel interface cable as described below:

1. Make sure that both your printer and computer are turned off.
2. Plug the cable connector securely into the printer.

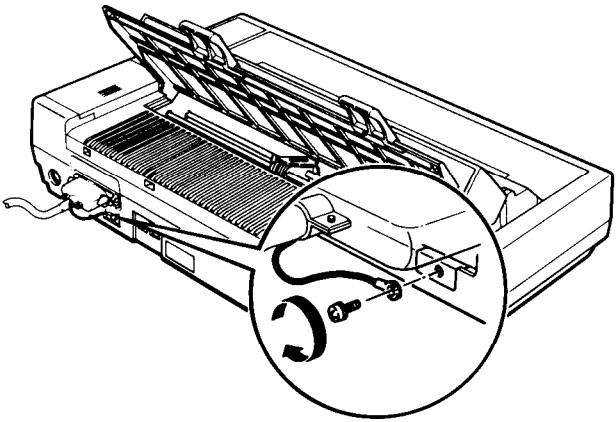


3. Squeeze the wire clips together until they lock in place on either side of the connector.



Note: If you do not lock these clips into place, your printed results may be incorrect.

4. If your cable has a ground wire, connect it to the ground screw beneath the interface connector.



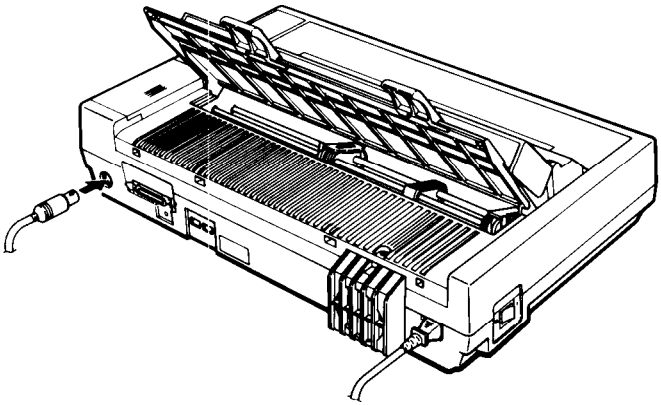
5. Plug the other end of the cable into the computer. If there is a ground wire at the computer end of the cable, attach it to the ground connector at the back of the computer.

The Serial Interface

Connect the serial interface cable as described below:

1. Make sure both your printer and computer are turned off.

2. Plug the connector securely into the printer.



WARNING: Do not plug more than one interface cable into the printer at once. This may damage the printer.

3. Plug the other end of the cable into the computer.

Setting Up Your Application Software

Now that you have set up and tested the printer, you should make sure that it works with your application programs.

Most application programs let you specify the type of printer you are using so that the program can take full advantage of the printer's features. Many of these programs provide an installation or setup menu that presents a list of printers to choose from.

If your application program has a printer selection menu, use the instructions below.

Choosing From a Menu

Because the family of Epson printers shares a great many commands, you can use an application program even if it does not list the LQ-850 or LQ-1050 on its printer selection menu. If the printer is not listed, choose one of the following printers. They are listed in order of preference.

LQ-800 (LQ-1000)
LQ-510/LQ-500
LQ-1500

If none of these printers is listed, select the first one available on the following list: LQ, EX, FX, LX, RX, MX, Epson printer, Standard printer, Draft printer.

To use all of the features of the printer, however, it is best to use a program with the LQ-850 or LQ-1050 on its menu. If your program does not list the printer, contact the software manufacturer to see if an update is available that supports your model.

Chapter 2
Paper Handling

Using Single Sheets 2-2
Loading Paper 2-2
Reloading During Printing 2-5

Using Continuous Paper 2-6
Positioning Your Continuous Paper Supply. 2-6
Loading Continuous Paper 2-7

Switching Between Continuous and Single Sheets 2-16
Switching to Single Sheets 2-16
Switching Back to Continuous Paper. 2-21

Printing on Special Paper. 2-25
The Paper Thickness Lever 2-25
Multi-part Forms 2-29
Labels 2-30
Envelopes 2-32

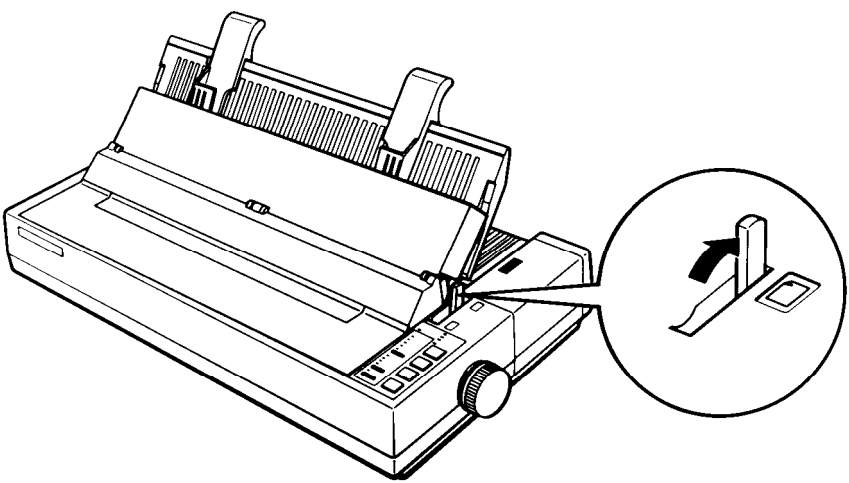
Using Single Sheets

Your printer can accommodate single sheets up to a maximum width of 10.1 inches (257 mm) on the LQ-850 and 14.3 inches **(364** mm) on the LQ-1050.

If you do most of your printing on single sheets, you may find it more convenient to install the optional cut sheet feeder. This option automatically inserts a new sheet and can hold up to 150 pages. For more details, see Chapter 5.

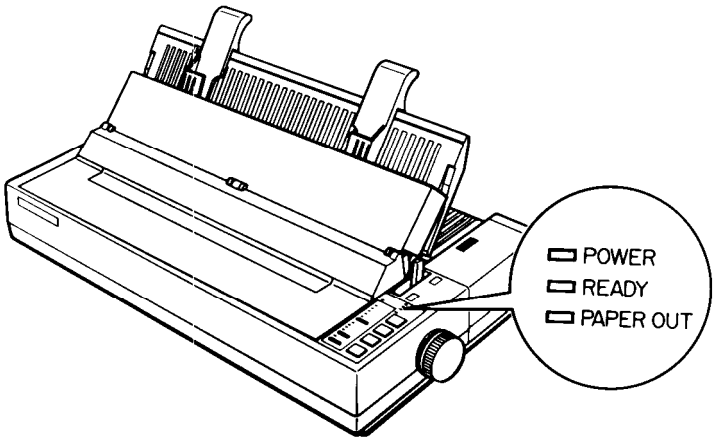
Loading Paper

1. Make sure the printer is turned off.
2. Push the paper release lever back to the single-sheet position. This position is marked by the icon shown below.



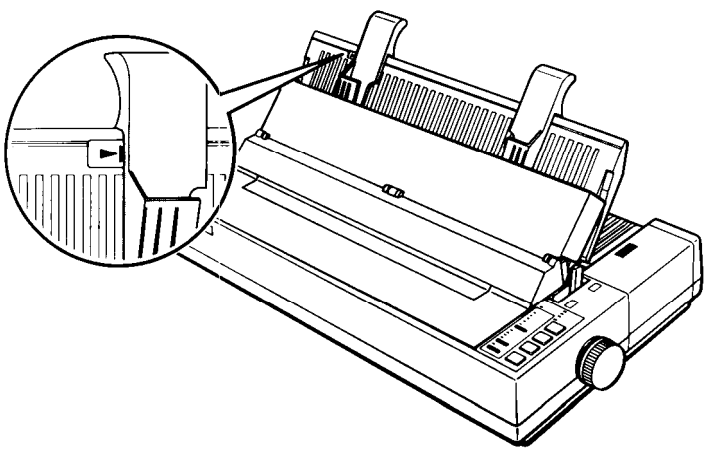
Note: For normal use, the paper thickness lever is set to position 2. See The Paper Thickness Lever later in this chapter if you are printing on **special** paper.

3. Turn on the printer. The POWER and PAPER OUT lights come on.

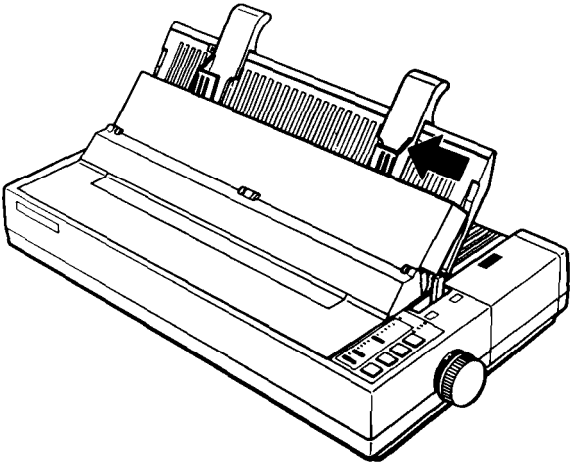


Note: Do not insert paper in the printer before turning on the printer.

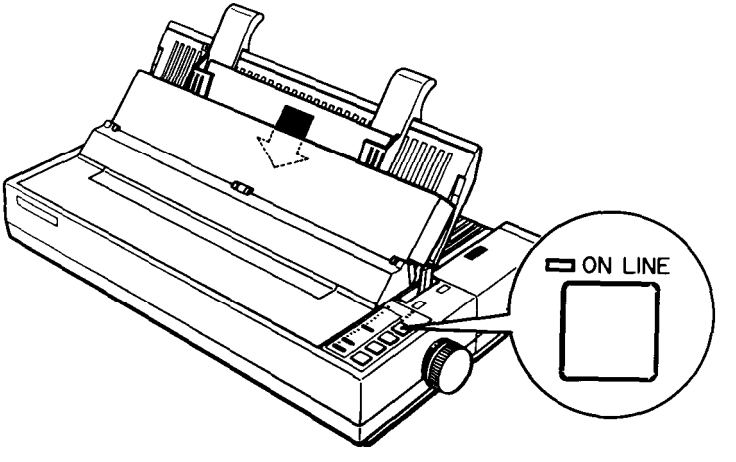
4. Move the left edge guide until it rests against the guide mark. (You may want to change this position later, depending on the margin settings of your application program.)



5. Adjust the right edge guide to match the width of your paper.



6. Slide the paper down between the edge guides until it meets resistance and the PAPER OUT light goes off. After about two seconds, the printer loads the paper automatically, and is set to ON LINE so that it can accept data from your computer.



WARNING: Never advance the paper using the platen knob except in the case of a paper jam or other paper feed problem. Using the platen knob while the printer is on may damage the printer and affect the loading and short tear-off positions.

Note: If the platen turns without loading the paper, press the ON LINE button to take the printer off line and completely remove the paper. Then re-insert the paper more firmly.

If you need to adjust the position of the paper after it is loaded, use the micro-adjustment feature described in Adjusting the Loading Position in Chapter 3.

To eject the paper, press the ON LINE button to take the printer off line; then press the LOAD/EJECT button.

You are now ready to begin printing.

Reloading During Printing

When you print a document of more than one page using single-sheet paper, the printer stops printing when it reaches the bottom of the page. When this happens, the ON LINE light either goes off automatically or remains on, depending on your application program software. If the ON LINE light remains on, the first thing you do is press the ON LINE button to take the printer off line.

Once the ON LINE light is off, remove the sheet that has just been printed (if necessary, press the FORM FEED button to eject the page). Then load a new sheet to start printing the next page and follow any additional prompts from your software.

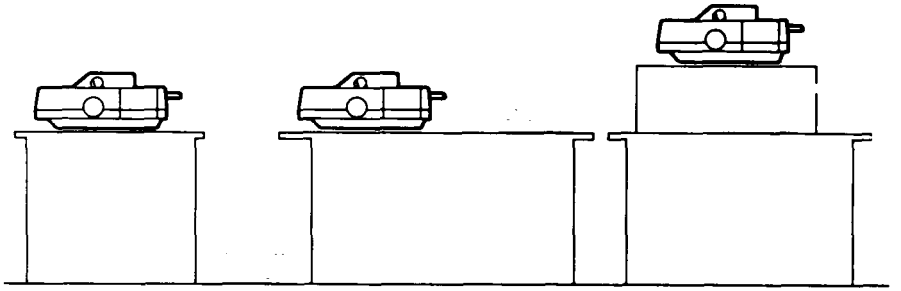
Using Continuous Paper

The tractor built into your printer is remarkably easy to load and operate. Its low-profile design takes up little space and can handle paper up to 10.0 inches or 254 mm wide on the LQ-850 and up to 16.0 inches or 406 mm wide on the LQ-1050.

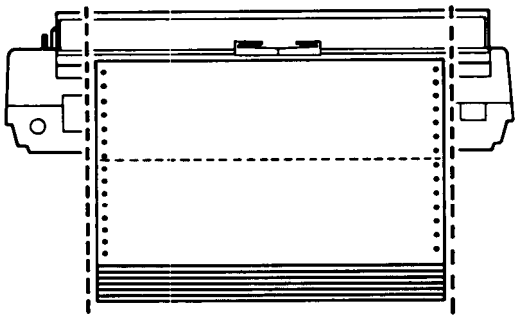
Positioning Your Continuous Paper Supply

An important consideration for achieving smooth and trouble-free paper feeding is the position of your paper supply.

Three ways of positioning your printer and continuous paper supply are shown below.

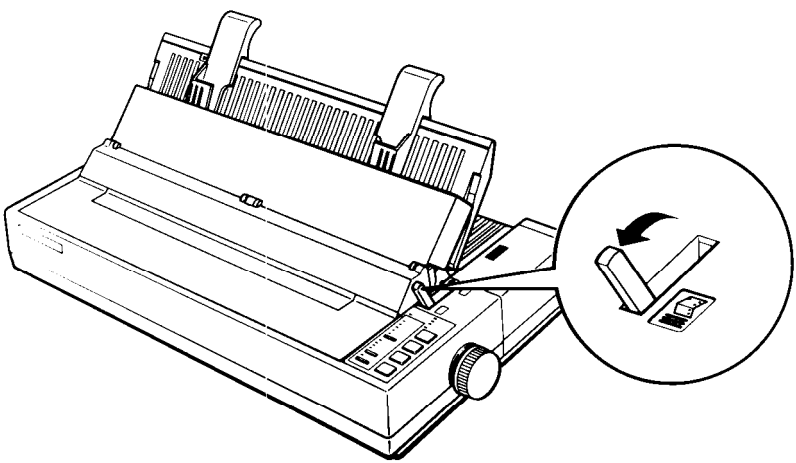


Be sure to align the paper supply with the paper loaded in the tractor so that the paper feeds smoothly into the printer.

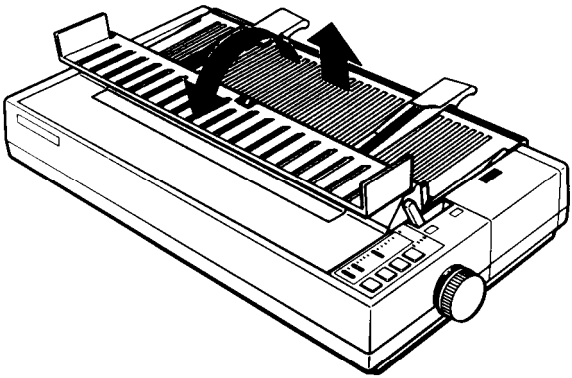


Loading Continuous Paper

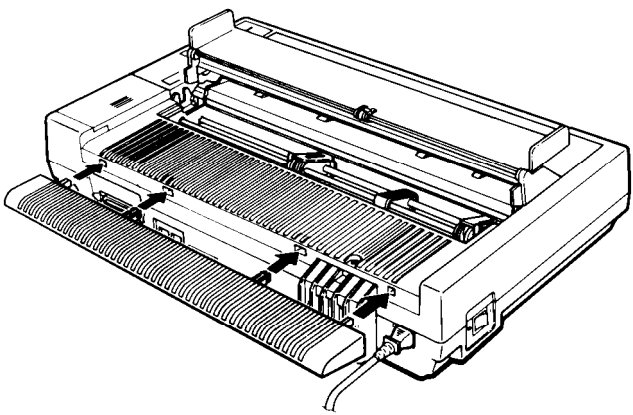
1. Be sure that the printer is turned off.
2. Pull the paper release lever forward to the continuous paper position. This position is marked by the icon shown in the illustration below.



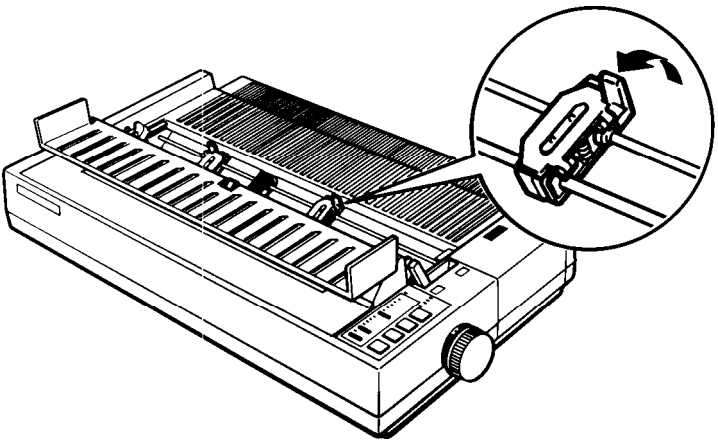
3. Open the paper guide cover and remove the paper guide.



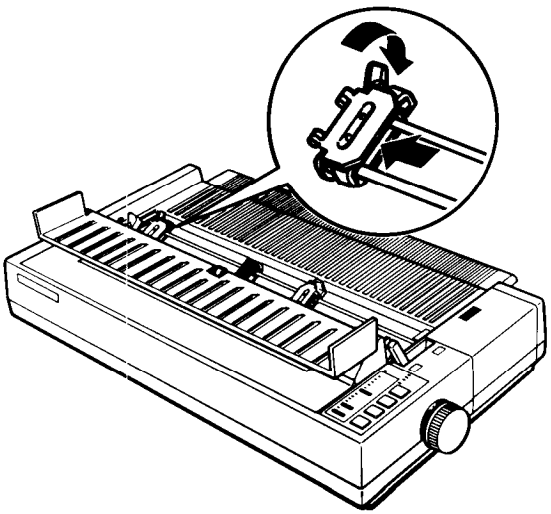
4. Attach the paper rest.



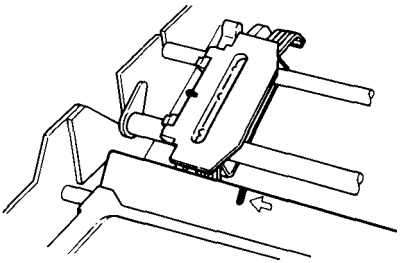
5. Release the sprocket units by pulling the sprocket lock levers forward as shown below.



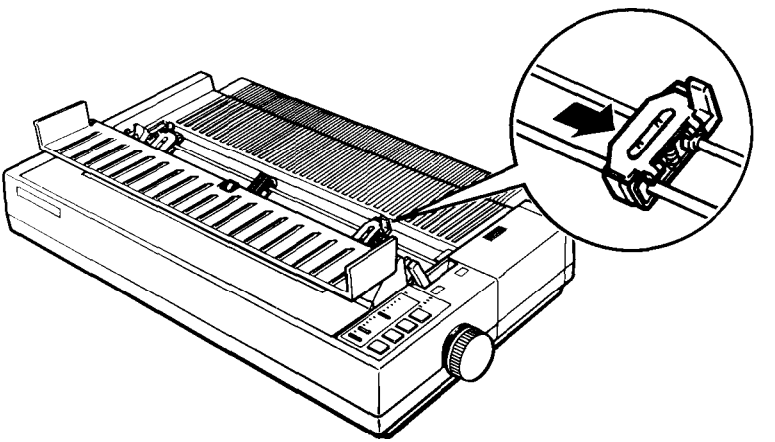
6. Slide the left sprocket unit all the way to the left and press the lever back to lock it in place.



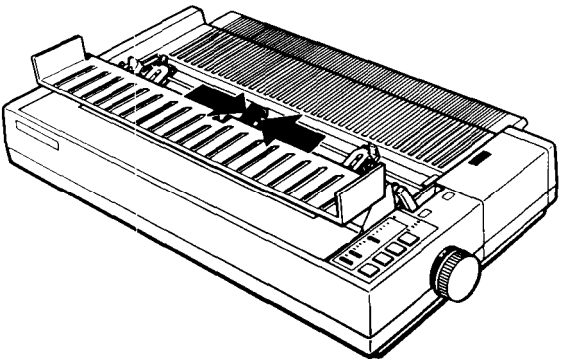
Note: The first printable column position is indicated by the mark shown in the illustration below.



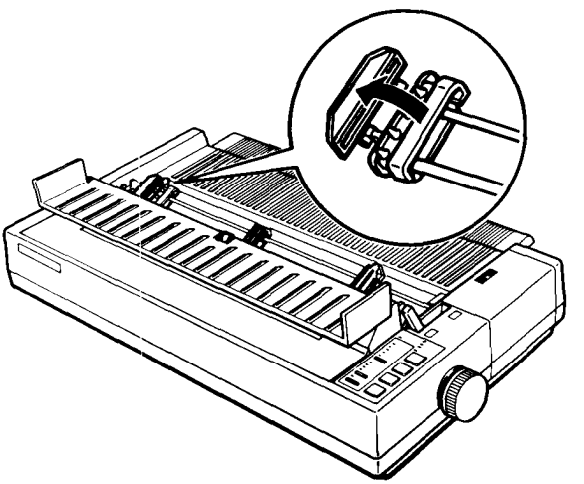
7. Slide the right sprocket unit so that it roughly matches the width of your paper, but do not lock it.



8. Move the paper support midway between the two sprocket units.

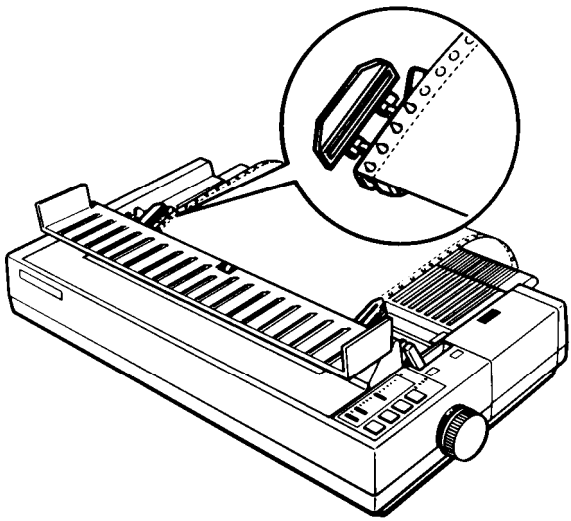


9. Open both sprocket covers.

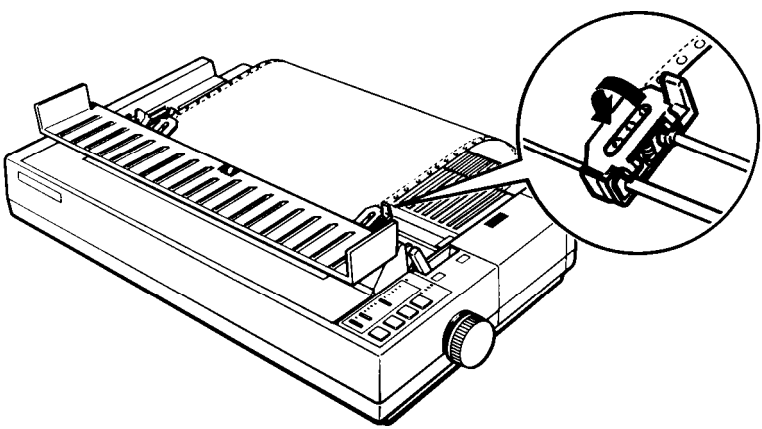


CAUTION: Make sure that the first sheet of paper has a clean, straight edge before inserting it into the printer.

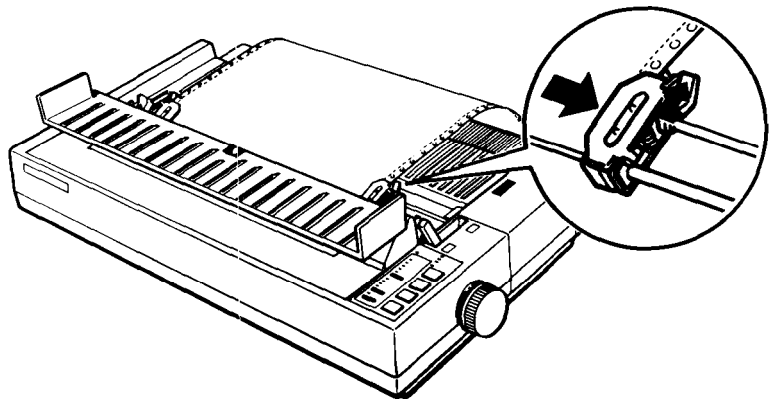
10. Fit the first four holes in the paper over the pins of both sprockets.



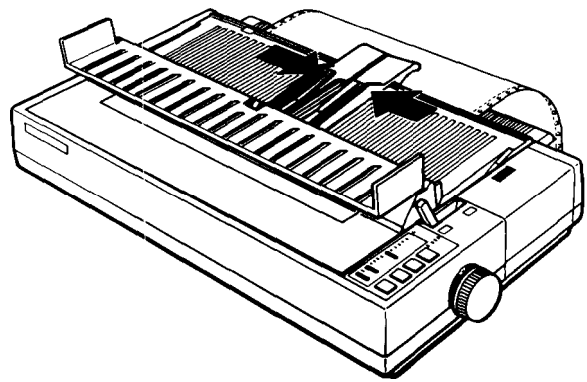
11. Close the sprocket covers.



12. Slide the right sprocket unit to a position where the paper is straight and has no wrinkles. Then lock it in place.



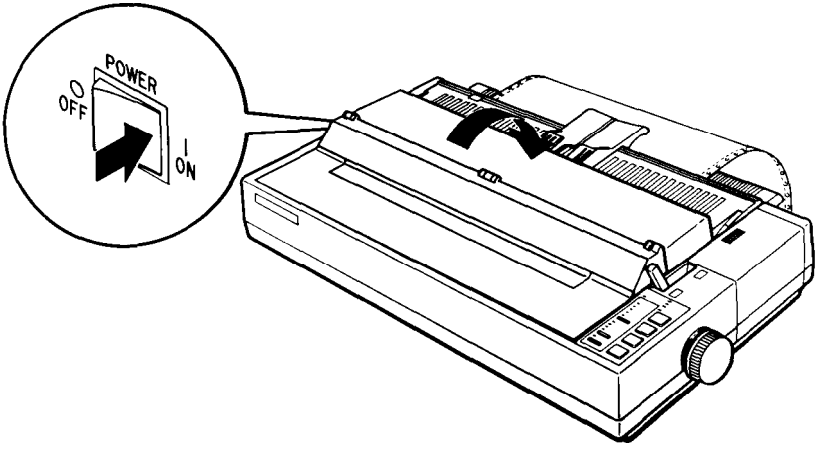
13. Reattach the paper guide on top of the paper as shown below. Then slide the edge guides together so that they meet at about the middle of the paper's width.



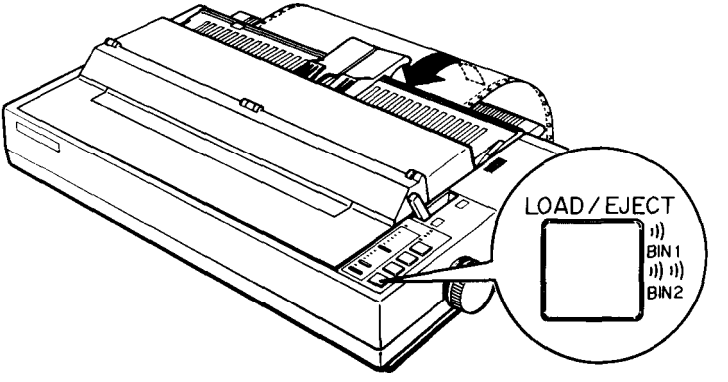
CAUTION: When using continuous paper, always make sure that the paper edge guides are pushed together in the middle of the paper guide.

Note: For normal use, the paper thickness lever is set to position 2. If you are using special paper, see The Paper Thickness Lever later in this chapter for details.

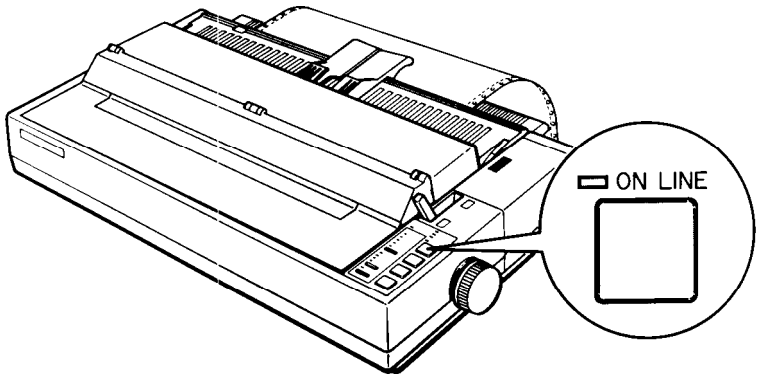
14. Close the paper guide cover and turn on the printer.



15. Press the LOAD/EJECT button to feed paper to the loading position.



16. Press the ON LINE button to set the printer on line so that it can accept data.



The printer remembers the loading position and advances each page to the same position. If you need to adjust the loading position, use the micro-adjustment feature. See Adjusting the Loading Position in Chapter 3.

CAUTION: Never adjust the loading position using the platen knob and never turn the platen knob while the printer is turned on.

When using continuous paper, you can choose the short tear-off feature to give you added paper handling capabilities. This feature makes it easier to detach printed pages and saves the blank pages that are usually lost between printing jobs. See Using Short Tear-off in Chapter 3 for details.

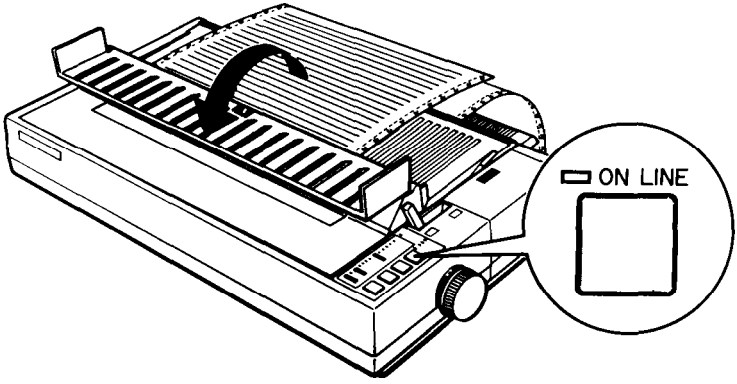
Switching Between Continuous and Single Sheets

Even with continuous paper loaded in the printer, the SmartPark feature allows you to easily switch to single-sheet printing without removing the continuous paper from the tractor.

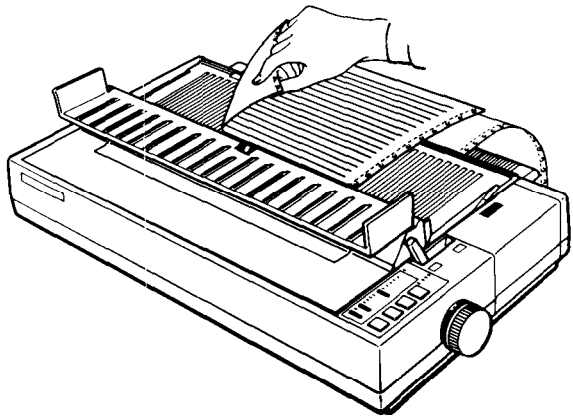
Switching to Single Sheets

To switch from continuous paper to single sheets, follow the steps below.

1. If the printer is on line, press the ON LINE button to set the printer off line. Open the paper guide cover.

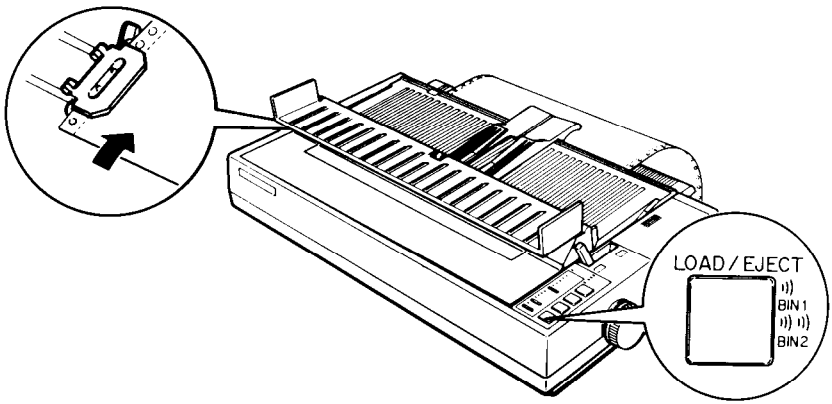


2. Tear off any outgoing sheets. If the paper has advanced past the print head, you need to press the FORM FEED button to advance your document to a point where it can be easily removed.



CAUTION: Make sure you tear off your printed document before pressing the LOAD/EJECT button. Reverse-feeding several pages at a time may result in a paper jam. This is especially true for narrow paper (less than 6 inches or 152.4 mm wide).

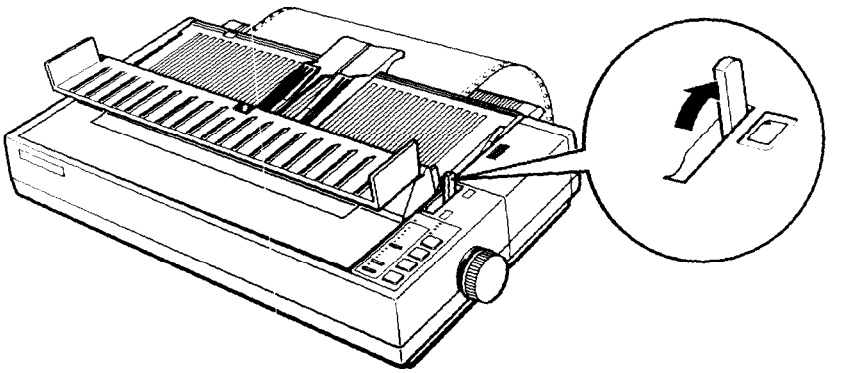
3. Press the LOAD/EJECT button to feed the continuous paper backward out of the printer and into the standby position. The paper is still attached to the tractor but no longer in the paper path. The PAPER OUT light comes on when the paper is completely out of the paper path.



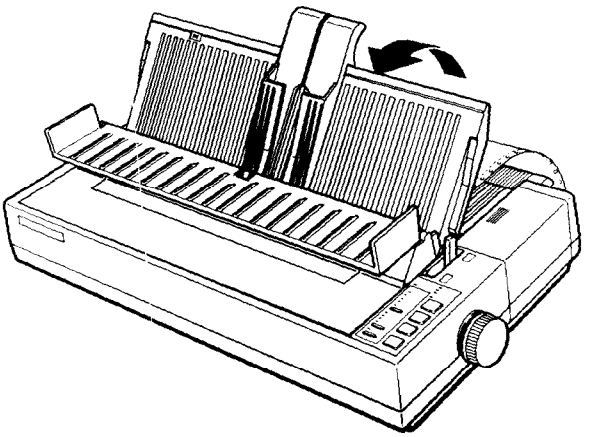
CAUTION: Pressing the LOAD/EJECT button once may not feed the paper far back enough to reach the standby position. If the PAPER OUT light does not come on, press the LOAD/EJECT button again. With normal-width continuous paper, you can press the LOAD/EJECT button up to three times. If, however, you are using narrow paper (between 4 and 6 inches or 101.6 and 152.4 mm) you can press the LOAD/EJECT button only once. Also, do not use this button to eject labels.

WARNING: Never feed labels backward through the printer. Labels can easily come off the backing sheet and jam the printer.

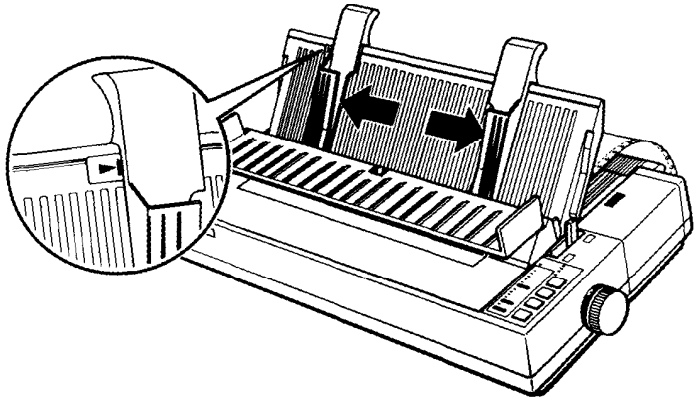
4. Push the paper release lever back to the Single-Sheet Position



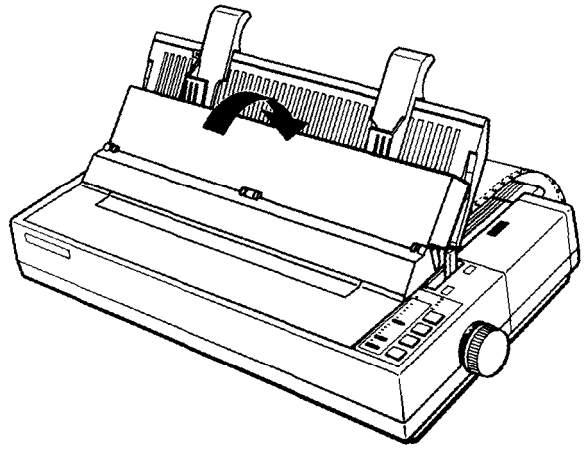
5. Lift the paper guide until it locks into place.



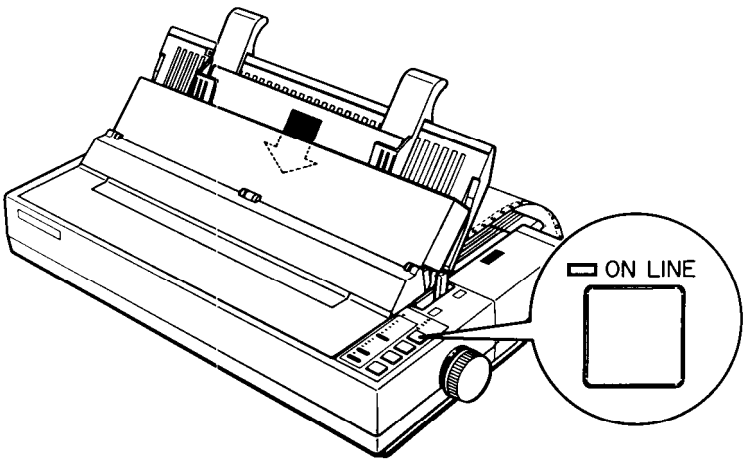
6. Move the left edge guide until it rests against the guide mark.
Adjust the right edge guide to match the width of your paper.



7. Close the paper guide **cover.**



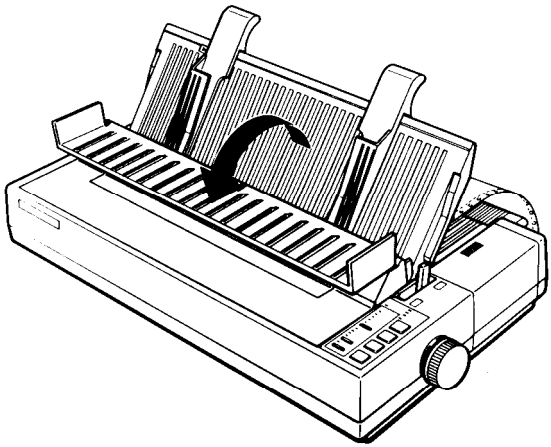
8. Slide a sheet of paper down between the edge guides until it meets resistance and the PAPER OUT light goes off. After about two seconds, the printer loads the paper automatically and sets itself ON LINE.



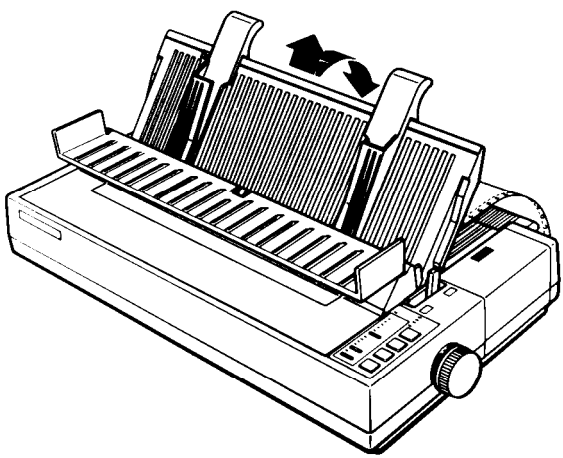
Switching Back to Continuous Paper

It is also easy to switch back to printing with continuous paper. Before switching to continuous paper, make sure that the single sheet is ejected and the printer is off line.

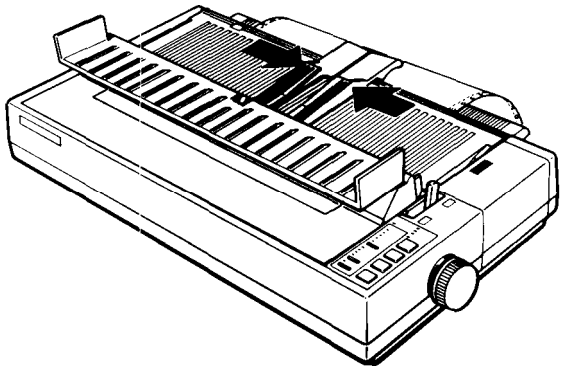
1. Open the paper guide cover.



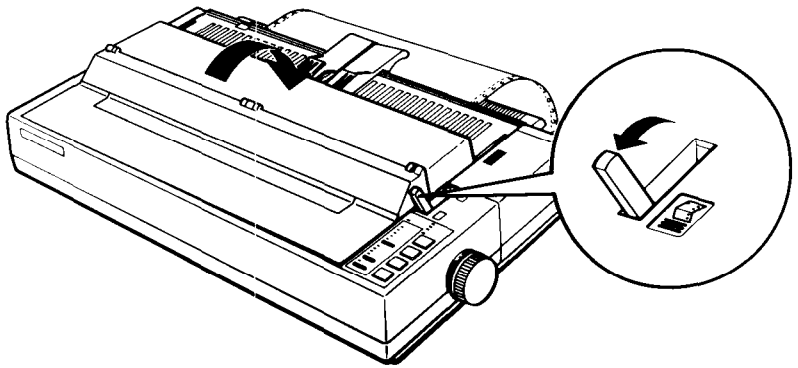
2. Lift up slightly on the paper guide and then lower it onto the back of the printer.



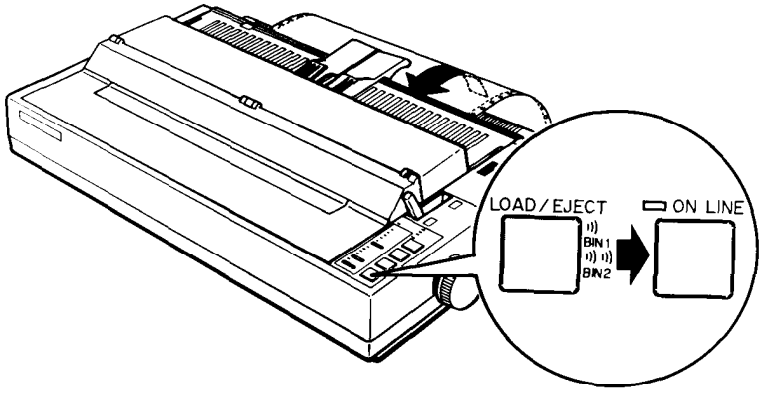
3. Slide the left and right edge guides together so that they meet at about the middle of the continuous paper's width.



4. Pull the paper release lever forward to the continuous paper position, then close the paper guide cover.



5. Press the LOAD/EJECT button to feed the continuous paper to the loading position. Then, press the ON LINE button to set the printer on line so that it can accept data.



Printing on Special Paper

In addition to printing on single sheets and continuous paper, your printer can also print on a wide variety of paper types, including multi-part forms, labels,, and envelopes.

If you are printing preprinted or multi-part forms or labels, it is recommended that you use the optional pull tractor. See The Pull Tractor in Chapter 5.

Before printing on special types of paper, you need to change the paper thickness setting.

WARNING: When printing on multi-part forms, labels, or envelopes, make sure that your application program settings keep the printing entirely within the printable area.

For multi-part forms and labels you should not print any closer than one-half inch (38 mm) from either side of the paper.

For information on the printable area for envelopes, see Envelopes later in this chapter.

The Paper Thickness Lever

To accommodate various thicknesses of paper, the printer is equipped with a paper thickness lever that can be set to eight positions. These positions are identified by a scale on the printer next to the lever.

Note: For normal use, set the paper thickness lever to position 2 on the scale.

If you have installed the optional film ribbon cartridge, and you want to use the single sheets or continuous paper, set the paper thickness lever to position 1.

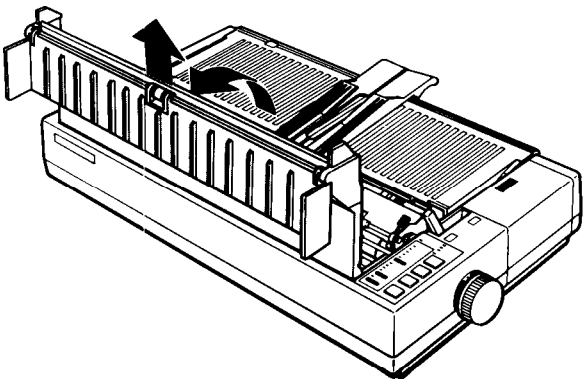
The following table gives you general guidelines for selecting the right paper thickness lever position for the type of paper you are using:

Paper type	Lever position
Paper (single sheets or continuous paper with film ribbon installed)	1
Thin paper	2 **or** 1
Paper (single sheets or continuous paper with standard ribbon installed)	2
24 lb paper (single sheets)	3
Multi-part forms	
2-sheet	3
3-sheet	4
4-sheet	5
Labels	4
Envelopes	
Air mail	4 or 5
Plain	6
Bond (20 lb.)	6
Bond (24 lb.)	7

Note: If the lever is set to position 4 or higher, the printing speed is reduced.

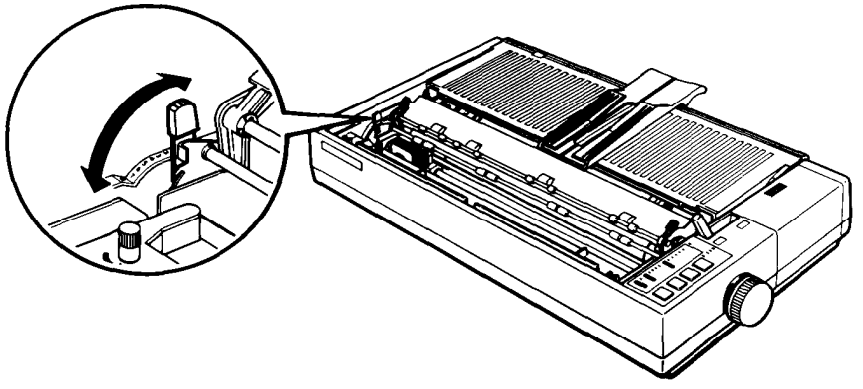
To change the paper thickness setting, follow these steps.

1. Make sure that the printer is turned off. Then remove the printer cover.

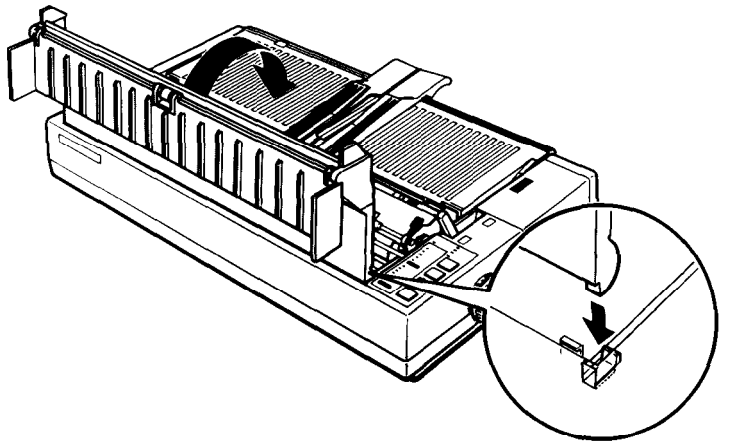


WARNING: If the printer has just been in use, the print head may be hot. Be careful not to touch it.

2. Select the paper thickness you want according to the table below. For normal use, the lever should always be set to position 2 on the scale.



3. Reattach the printer cover unit.



To help you check the position of the paper thickness lever, the orange MULTI-PART light on the control panel comes on if the lever is set to position 4 or higher.

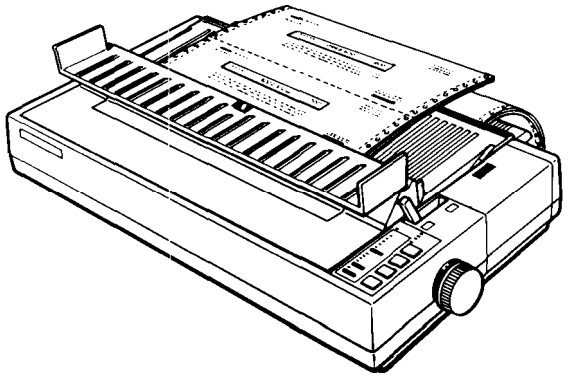
WARNING: Always return the lever to position 2 when you go back to printing on ordinary paper. Continuous printing with the lever set at a position higher than 2 can shorten the life of the print head.

Printing past the edge of envelopes, multi-part forms, labels, or thicker-than-normal paper can damage the print head.

Multi-part Forms

With the built-in tractor unit, your printer can print on continuous multi-part forms. You can use multi-part forms that have up to four parts including the original. Make sure you set the paper thickness lever to the proper position.

Except for the paper thickness lever setting, you load multi-part paper the same way as continuous paper. For details, see Loading Continuous Paper in this chapter. Also see Adjusting the Loading Position and Page Length in Chapter 3.



When you set the paper thickness lever to position 4 or above, the MULTI-PART light comes on and the printer reduces its printing speed.

CAUTION: Do not use multi-part forms with the single-sheet feeding system or the optional cut sheet feeder.

Labels

If you need to print labels, always use labels mounted on a continuous backing sheet with sprocket holes for use with a tractor. Do not try to print labels as single sheets because labels on a shiny backing sheet almost always slip a little.

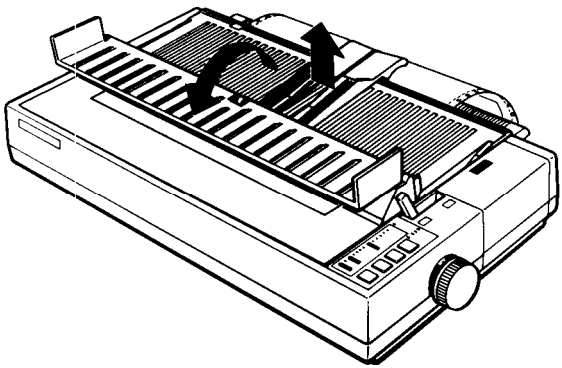
You load labels the same way that you load continuous paper except that the paper thickness lever must be adjusted for printing labels. See Loading Continuous Paper earlier in this chapter. For the correct paper thickness setting, see The Paper Thickness Lever earlier in this chapter.

WARNING: Never feed labels backward through the printer. Labels can easily peel off the backing and jam the printer. Therefore, never use the LOAD/EJECT button to eject labels. Also, never use the short tear-off function with labels. (Be sure to set DIP switch 2-7 to OFF.) If a label does become stuck in the printer, contact your Epson dealer.

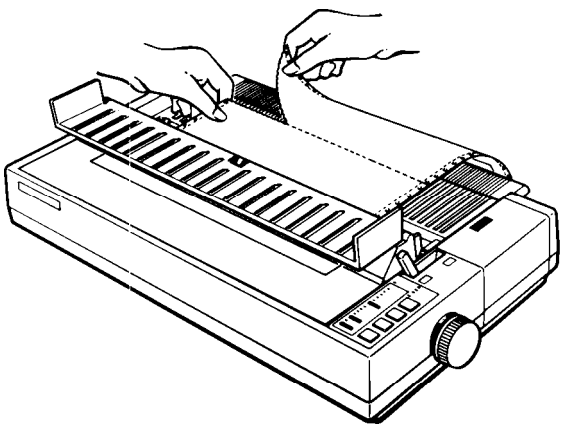
Because labels are especially sensitive to temperature and humidity, always use them under normal operating conditions. Don't leave labels loaded in the printer between jobs; they curl around the platen and may jam when you resume printing.

To eject labels from the printer, follow these steps:

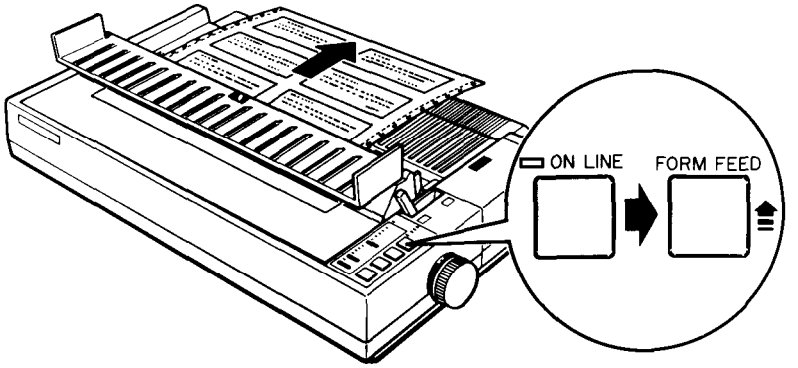
1. Open the paper guide cover and remove the paper guide.



2. Tear off the sheet of Labels at the perforation behind the push tractor.



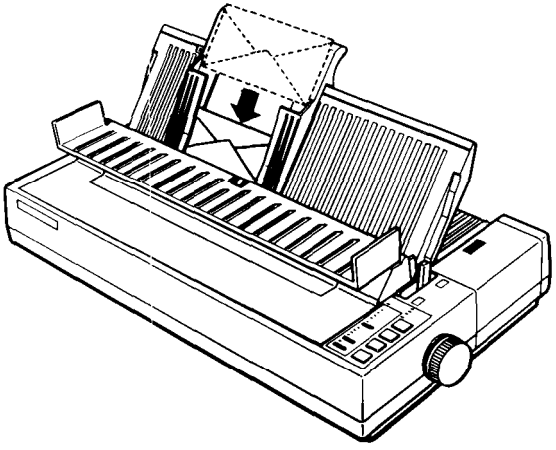
3. Press the ON LINE button to set the printer off line. Then press the FORM FEED button to eject the labels.



Envelopes

You can feed envelopes individually using the single-sheet loading feature. Before loading envelopes, adjust the position of the paper thickness lever according to the Paper Thickness Lever table earlier in this chapter. For details on paper handling, see Using Single Sheets earlier in this chapter. See Chapter 5 for a description of how to use envelopes with the optional cut sheet feeder.

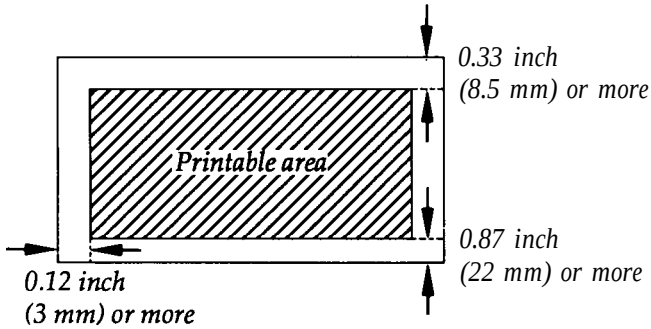
When manually feeding an envelope, you may have to push it down slightly to get it to feed properly. After about two seconds, the envelope loads automatically.



CAUTION: The printable area for envelopes is shown on the next page. The print head must not go past the left or right edge of the envelope or other thick paper. Make sure that your application program page setup keeps the printing entirely within this printable area.

Always keep the longer side of the envelope horizontal.

If you use No. 6 envelopes, make sure the left edge guide is aligned with the arrow on the paper guide.



CAUTION: Envelope printing is available only at normal temperature (41°F to 95°F or 5°C to 35°C).

To make sure that the printing fits within the printable area, always print a test sample using a normal sheet of paper before printing on envelopes.

Chapter 3
Using the Printer

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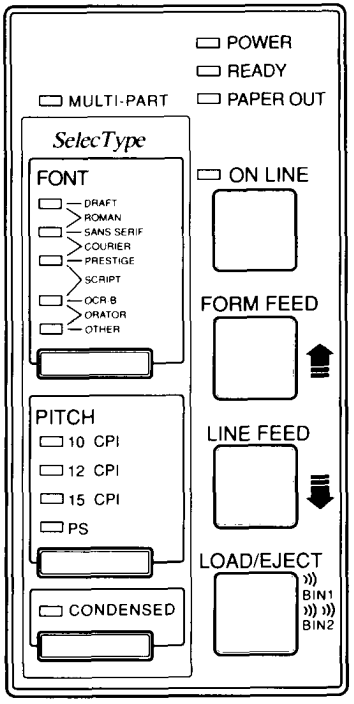
Operating the Control Panel

The indicator lights give you the current status of the printer. The buttons and paper handling functions let you control many of the printer settings.

Lights



MULTI-PART (orange)
On when the paper thickness lever is set to position 4 or higher. (For regular paper, this light should not be on.) When this light is blinking, the micro-adjustment function can be used.

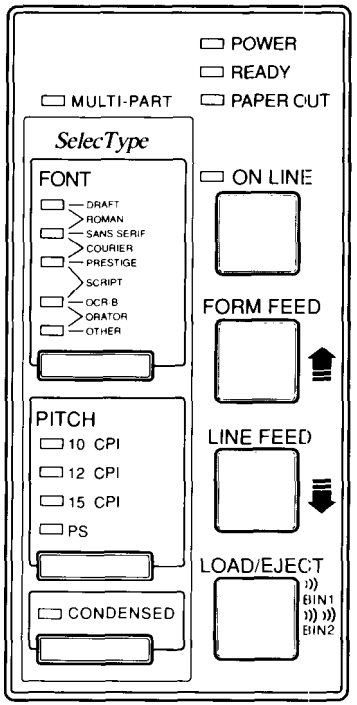
POWER (green)
On when the POWER switch is on and power is supplied.

READY (green)
On when the printer is ready to accept input data. Flickers during printing.

PAPER OUT (red)
On when the printer is out of paper or when continuous paper is in the standby position.

ON LINE (green)
On when the printer is on line and ready to accept data.

Buttons



BIN 1/BIN 2
When the printer is on line, press this button to select either bin 1 or bin 2 of the double-bin cut sheet feeder. The beeper sounds once if you select bin 1 and twice if you select bin 2.

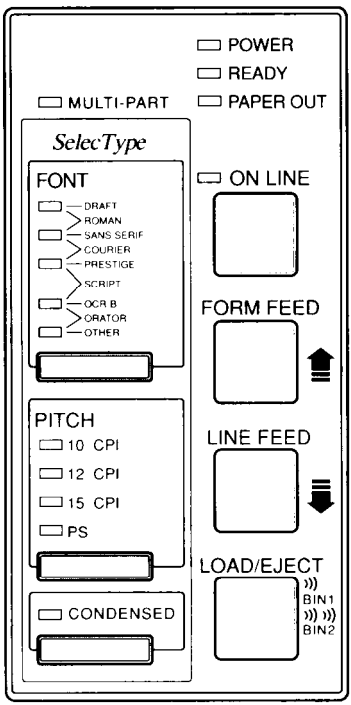
ON LINE
This button controls the printer's on line and off line status. Press this button to put the printer on line or to take it off line. When the printer is on line, the ON LINE light is on and the printer can receive and print data from the computer.

FORM FEED
When the printer is off line, press this button to eject a single sheet of paper or to advance continuous paper to the top of the next page.

LINE FEED
When the printer is off line, press this button to advance the paper one line, or hold it down to advance the paper continuously.

LOAD/EJECT
When the printer is off line, press this button to feed paper to the loading position or to eject paper that is already loaded. Paper is ejected forward if the paper release lever is set to the single-sheet position and backward (out of the paper path) if the release lever is set to the continuous paper position.

SelecType



FONT

Press this button to select a font. The orange indicator lights show which font you select. See Selecting Typestyles later in this chapter for more information.

PITCH

Press this button to select the character spacing. You can choose 10 CPI, 12 CPI, 15 CPI, or PS (proportional spacing). The orange indicator light shows the spacing you select. You cannot select proportional spacing with draft mode. (Draft mode overrides proportional spacing.)

CONDENSED

Press this button to turn the condensed mode on and off. The orange indicator light is on when the printer is in the condensed mode. In the condensed mode, all characters are printed at approximately 60 percent of their normal width. You cannot select condensed mode with a pitch of 15 cpi.

Other Control Panel Features

The control panel of your printer also gives you access to several special functions.

Self test:	Draft, SuperDraft, and Letter Quality self test functions are built into the printer. The self test printout lets you check the current DIP switch settings and operating status of the printer. You can start the printer's self test by holding down the LINE FEED button (for draft mode) or the FORM FEED button (for Letter Quality mode) while turning on the printer. See Running the Self Test in Chapter 1 for more information.
Micro-adjustment:	By pressing the FORM FEED or LINE FEED button immediately after loading paper or when using short tear-off, you can make fine adjustments to the loading and short tear-off positions. These positions can only be adjusted while the MULTI-PART light is blinking. See Adjusting the Loading Position and Using Short Tear-off later in this chapter.
Data dump:	By holding down both the LINE FEED and FORM FEED buttons while you switch on the printer, you turn on the data dump mode. This feature allows advanced users to locate the source of communications problems between the computer and printer. See Using the Data Dump Mode later in this chapter for more information.
Input buffer control:	To enable or disable the input buffer, press the LOAD/EJECT button while you turn on the power. The beeper sounds once if the input buffer is disabled and twice if it is enabled.

Selecting Typestyles

You can produce a wide range of typestyles by selecting different character fonts, widths, and other enhancements from the SelecType control panel or by using software commands. This section describes only the features controlled by SelecType. To use software commands, see the Command Summary in Chapter 9.

You can use the SelecType section of the control panel to choose fonts, character spacing, and condensed printing. Orange lights indicate which features you have chosen.

Note: The settings you select using the SelecType panel remain valid even after you turn off, reset, or initialize the printer. However, commands from your application program temporarily override the SelecType settings.

Some application programs are designed to control all typestyle functions. These programs cancel all previous typestyle settings by sending certain software commands before printing. Because these commands override SelecType settings, you should use the program's print options instead of SelecType to select your typestyles. If SelecType does not work with a particular application, check your software manual for instructions on selecting typestyles.

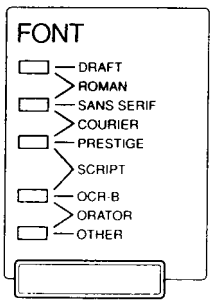
Character Fonts

The printer has ten built-in fonts: draft, Epson Roman, Epson Sans Serif, Epson Courier, Epson Prestige, Epson Script, OCR-B, OCR-A, Epson Orator, and Epson Orator-S.

You can select eight of the built-in fonts using SelecType. When you press the FONT button, the printer scrolls through the built-in fonts on the control panel.

To select a font, press the FONT button until the corresponding orange indicator light (or lights) come on. When the top light is on, draft is selected. When the top two lights are on, Epson Roman is selected. When only the second light is on, Epson Sans Serif is selected. When the second and third lights are on, Epson Courier is selected, and so on.

You can select the other two fonts, OCR-A and Orator-S, only with software commands. See ESC K in Chapter 9 for more information. When you select one of these fonts, the OTHER indicator light is on.



There are two printing speeds for the draft font, SuperDraft and normal draft. These printing speeds are controlled by DIP switch 1-6.

The following samples show the character set available for each font.

Draft (SuperDraft)

```
 !"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJK
LMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuv
wxyz{|}ÇüéäàåçêëèïîìÄÅÉæÆôöòûùÿÖÜ¢£¥₧ƒáíóú
ñÑªº¿⌐¬½¼¡«»
```

Draft (normal draft)

```
 !"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJK
LMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuv
wxyz{|}ÇüéâäàåçêëèïîìÄÅÉæÆôöòûùÿÖÜ¢£¥₧ƒáíóú
ñÑªº¿⌐¬½¼¡«»
```

Epson Roman

```
!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJK
LMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuv
wxyz{¦}Çüéâäàåçêëèïîì ÄÅÉæÆôöòûùÿÖÜ¢£¥₧ƒáíóú
ñÑªº¿⌐¬½¼¡«»
```

Epson Sans Serif

```
!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJK
LMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuv
wxyz{¦}Çüéâäàåçêëèïîì ÄÅÉæÆôöòûùÿÖÜ¢£¥₧ƒáíóú
ñÑªº¿⌐¬½¼¡«»
```

Epson Courier

```
!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJK
LMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuv
wxyz{¦}Çüéâäàåçêëèïîì ÄÅÉæÆôöòûùÿÖÜ¢£¥₧ƒáíóú
ñÑªº¿⌐¬½¼¡«»
```

Epson Prestige

```
!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJK
LMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuv
wxyz{¦}Çüéâäàåçêëèïîì ÄÅÉæÆôöòûùÿÖÜ¢£¥₧ƒáíóú
ñÑªº¿⌐¬½¼¡«»
```

Epson Script

```
!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJK
LMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuv
wxyz{¦}Çüéâäàåçêëèïîì ÄÅÉæÆôöòûùÿÖÜ¢£¥₧ƒáíóú
ñÑªº¿⌐¬½¼¡«»
```

OCR-B

```
!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJK
LMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuv
wxyz{|}ÇüéâäàåçêëèïîìÄÅÉæÆôöòûùÿÖÜ¢£¥₧ƒáíóú
ñÑªº¿⌐¬½¼¡«»
```

OCR-A

```
!"#¤%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJK
LMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuv
wxyz{|}ÇüéâäàåçêëèïîìÄÅÉæÆôöòûùÿÖÜ¢£¥₧ƒáíóú
ñÑªº¿⌐¬½¼¡«»
```

Note: The OCR-B and OCR-A fonts can be read by an optical character reader (also known as a document reader or image scanner) for input into another computer. Print enhancements, such as bold and underlining, cannot be read by a character reader.

Epson Orator

```
!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJK
LMNOPQRSTUVWXYZ[\]^_`ABCDEFGHIJKLMNOPQRSTUV
WXYZ{|}ÇÜÉÂÄÀÅÇÊËÈÏÎÌÄÅÉÆÆÔÖÒÛÙŸÖÜ¢£¥₧ƒÁÍÓÚ
ÑÑªº¿⌐¬½¼¡«»
```

Epson Orator-S

```
!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJK
LMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuv
WXYZ{|}ÇüéâäàåçêëèïîìÄÅÉæÆôöòûùÿÖÜ¢£¥₧ƒáíóú
ñÑªº¿⌐¬½¼¡«»
```

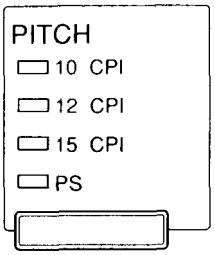
The draft mode uses fewer dots per character for high-speed printing, which makes it ideal for rough drafts and editing work.

Letter Quality fonts take a little longer to print, but produce nicely formed characters suitable for most documentation requirements.

Character Spacing

To select character spacing, press the PITCH button until the indicator light of the desired character spacing comes on. The table below shows the character spacings available with each font.

Font	Character spacing
Draft	10, 12, 15
Epson Roman	10, 12, 15, Proportional
Epson Sans Serif	10, 12, 15, Proportional
Epson Courier	10, 12, 15
Epson Prestige	10, 12, 15
Epson Script	10, 12, 15
OCR-B	10
OCR-A	10
Epson Orator	10
Epson Orator-S	10



SuperDraft and normal draft fonts cannot be combined with proportional spacing because draft overrides proportional.

For the fixed pitch settings (10,12, and 15 cpi), each character is given an equal amount of space. For proportional spacing, character width varies from one character to the next. For example, a narrow letter like i receives less space than a wide letter like W.

The following printout compares the three pitches with proportional spacing.

This is 10 cpi printing.
This is 12 cpi printing.
This is 15 cpi printing.
This is proportional spacing.

Condensed Mode

You can use the condensed mode to change the size of printed **characters.** In the condensed mode, characters are approximately 60 percent of the width of normal characters. Hence, condensed printing is very useful for spreadsheets and other applications where you need to print the maximum amount of information on a page. You can combine the condensed mode with 10 and 12 cpi printing and proportional spacing, but not with 15 cpi.

To select the condensed mode, simply press the CONDENSED button so that the orange indicator light comes on. To turn off the condensed mode, press the button again.

The following printout compares normal 10 and 12 cpi with condensed 10 and 12 cpi. The condensed 10 cpi is 17 cpi, and the condensed 12 cpi is 20 cpi.

This is 10 cpi printing.
This is condensed 10 cpi printing.
This is 12 cpi printing.
This is condensed 12 cpi printing,

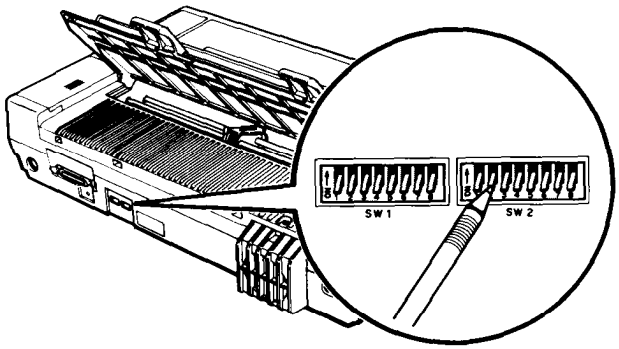
Setting the DIP Switches

The printer has two sets of DIP switches located on the back panel. By changing the settings of these switches, you can control various printer features, such as the character set and page length. The new settings become effective when you turn on, reset, or initialize the printer.

Changing a DIP Switch Setting

To change a DE' switch setting, follow these steps:

1. Turn off the printer.
2. Locate the DIP switches on the back of the printer.
3. Use a pointed object, such as a pen, to change the DIP switch settings. A DIP switch is on when it is up, and off when it is down.



The new DIP switch settings take effect when you turn the printer on.

The DIP Switch Tables

The tables below describe the DIP switch settings.

DIP Switch 1

SW	Description	On	Off
1-1 1-2 1-3	International character set/ Graphics character set	See tables 1, 4	
1-4	Character set	Graphics	Italics
1-5	Print direction for graphics	Unidir.	Bidir.
1-6	SuperDraft	Off	On
1-7	Cut sheet feeder mode	On	Off
1-8	Skip over perforation	On	Off

DIP Switch 2

SW	Description	On	Off
2-1 2-2	Page length selection	See table 5	
2-3 2-4	Interface type/parity	See table 2	
2-5 2-8	Baud rate	See table 3	
2-7	Short tear-off mode	On	Off
2-8	Auto line feed	On	Off

Table 1 International character sets

Country	SW 1-1	SW 1-2	SW 1-3	SW 1-4
USA	On	On	On	Off
France	On	On	Off	Off
Germany	On	Off	On	Off
UK	On	Off	Off	Off
Denmark I	Off	On	On	Off
Sweden	Off	On	Off	Off
Italy	Off	Off	On	Off
Spain	Off	Off	Off	Off

See Selecting an International Character Set later in this chapter for other character sets.

International character sets are selectable only when DIP switch 14 is off.

Table 2 Interface/parity selection

Interface type	**Parity**	**SW 2-3**	**SW 2-4**
Parallel	—	Off	Off
Serial	Even	On	Off
Serial	Odd	Off	On
Serial	None	On	On

Table 3 Baud rate selection

Baud rate	SW 2-5	SW 2-6
9600 bps	Off	Off
19200 bps	On	Off
1200 bps	Off	On
300 bps	On	On

Table 4 Graphics character sets

Graphics character set	SW 1-1	SW 1-2	SW 1-3	SW 1-4
PC 437 (United States) Epson Extended Graphics	On	On	On	On
PC 850 (Multilingual)	On	On	Off	On
PC 860 (Portugal)	On	Off	On	On
PC 863 (Canada-French)	On	Off	Off	On
PC 865 (Norway)	Off	On	On	On

Graphics character sets are selectable only when the DIP switch 1-4 is on.

The graphics character sets are also called code page tables.

Table 5 Page length selection

Page length	SW 2-1	SW 2-2
11 inches	Off	Off
12 inches	On	Off
8.5 inches	Off	On
11.7 inches	On	On

The DIP Switch Functions

Auto line feed

When auto line feed is on (DIP switch 2-8 on), each carriage return code (CR) is automatically followed by a line feed code (LF).

Printing direction

With unidirectional printing, the print head prints in one direction only. This allows for precise vertical alignment, making it ideal for printing graphics such as lines and boxes. With bidirectional printing, the print head prints in both directions. This is faster than unidirectional printing.

When DIP switch 2-6 is off, the printer prints unidirectionally; when it is on, the printer prints bidirectionally. Either setting can be overridden by a software command (ESC U).

To achieve precise vertical alignment without the slower printing speed caused by unidirectional printing, see your Epson dealer for adjustment of your bidirectional print settings.

Tear-off mode

When DIP switch 2-7 is on, the short tear-off mode is on. This feature automatically advances continuous paper to the tear-off position, and then reverse-feeds the paper to the loading position. See Using Short Tear-off later in this chapter.

CAUTION: Do not use the short tear-off mode with labels.

SuperDraft

When DIP switch 16 is off, SuperDraft is selected. When the DIP switch is on, normal draft is selected. SuperDraft prints at 300 characters per second but produces characters that are not as fully formed as the ones produced with normal draft. If you select a feature such as emphasized, double-strike, or condensed in SuperDraft mode, the printing speed will temporarily switch to normal draft speed until the enhancement is turned off. This allows you to use any print enhancement without canceling SuperDraft.

Page Length

To obtain one of the four page lengths, set DIP switches 2-1 and 2-2 according to the Page length selection table. The page lengths are: 8.5 inches (216 mm), 11 inches (279 mm), 11.7 inches (296 mm), and 12 inches (305 mm).

Page length selection

Page length	SW 2-1	SW 2-2
11 inches	Off	Off
12 inches	On	Off
8.5 inches	Off	On
11.7 inches	On	On

Note: Be sure to set the page length to match the paper you are using.

Other page lengths can be set using the commands ESC C and ESC C 0. See the Command Summary in Chapter 9 for details.

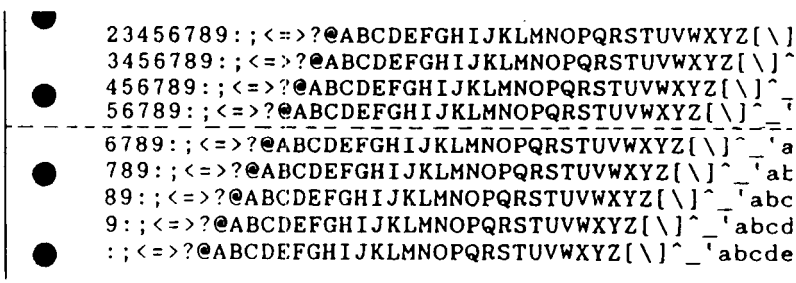
Note: If you are using the cut sheet feeder, the page length is automatically set when you run the printer's self test. For details, see The Cut Sheet Feeder in Chapter 5.

Skip Over Perforation

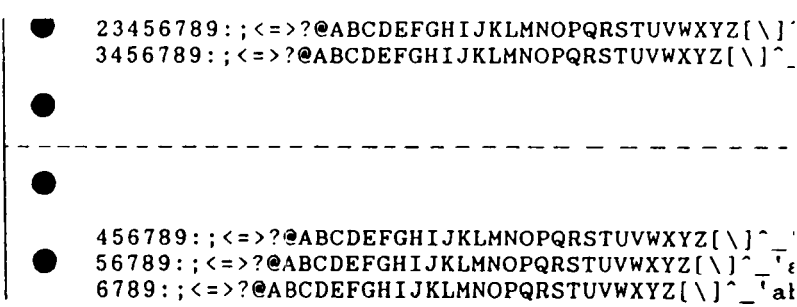
By changing the setting of DIP switch 1-8, you can set skip over perforation to on or off. If this feature is on when using continuous paper, a one-inch margin is provided between the last printable line on one page and the first printable line on the next page. This feature is very convenient if your application program does not provide for top and bottom margins.

If you adjust your loading position correctly, you can get half of the margin at the bottom of one page and half at the top of the next page, as shown in the following illustration.

DIP switch 1-8 off (Skip over perforation off)



DIP switch 1-8 on (Skip over perforation on)



Note: Most application programs take care of top and bottom margins. Use skip over perforation only if your program does not provide these margins.

The skip over perforation setting can be set to values other than one inch by using the ESC N command. See the Command Summary in Chapter 9 for details.

Adjusting the Loading Position

The loading position is the position of the paper when it has been automatically loaded by the printer.

This position is important because it determines where the printing begins on the page. If the printing is too high or too low on the page, change the loading position using the micro-adjustment feature described in the next section.

You can set separate loading positions for single sheets, continuous paper, and sheets loaded, by the cut sheet feeder.

CAUTION: Never use the platen knob to feed paper except in case of a paper jam or other paper feeding problem. (If you need to use the platen knob, make sure the power is off.) If you need to adjust the loading position, always use the micro-adjustment feature.

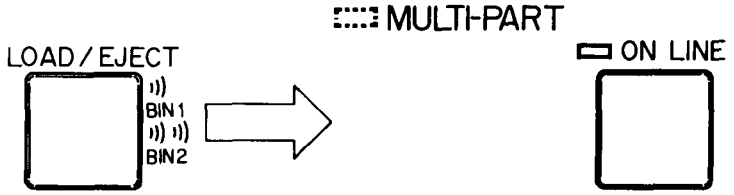
Until the loading position is reset, the printer remembers this position even if it is turned off, and uses it as a reference point for feeding paper.

The micro-adjustment feature moves the paper in 1/180-inch increments to make fine adjustments to the loading position. You can use this feature to adjust the loading position immediately after loading paper only.

Once you have used micro-adjustment to change the loading position of continuous paper, the printer remembers that position even after it is turned off. However, when you use micro-adjustment to change the loading position of single-sheet paper, the printer does not remember this position after the power is turned off. When the power is turned back on,, the loading position returns to its factory setting.

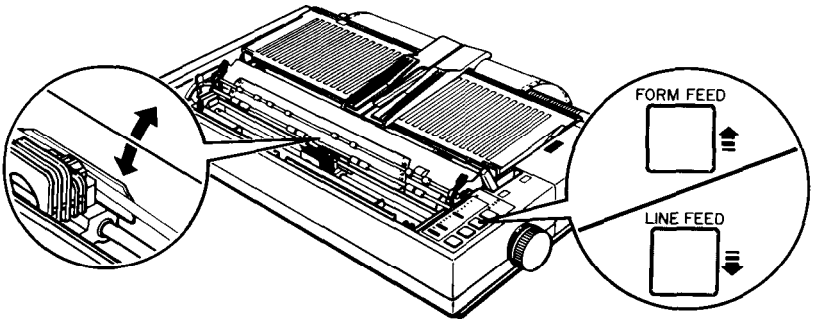
Using Micro-adjustment

1. Make sure that the printer is turned on and that either a single sheet or continuous paper is ready to be loaded.
2. A single sheet loads automatically. For continuous paper, press the LOAD/EJECT button to feed paper to the loading position. Then press the ON LINE button; the MULTI-PART light begins to blink.



Note: You can use the FORM FEED and LINE FEED buttons for micro-adjustment only while the MULTI-PART light is blinking.

3. Press the FORM FEED button to feed the paper forward or the LINE FEED button to feed the paper backward.



Note: When the paper reaches the factory-set loading position, the printer beeps and micro-adjustment feeding pauses for a moment before continuing. You can use this factory setting as a reference point when adjusting the printer's loading position. When the paper reaches either the minimum or maximum top margin, the printer beeps and the paper stops moving.

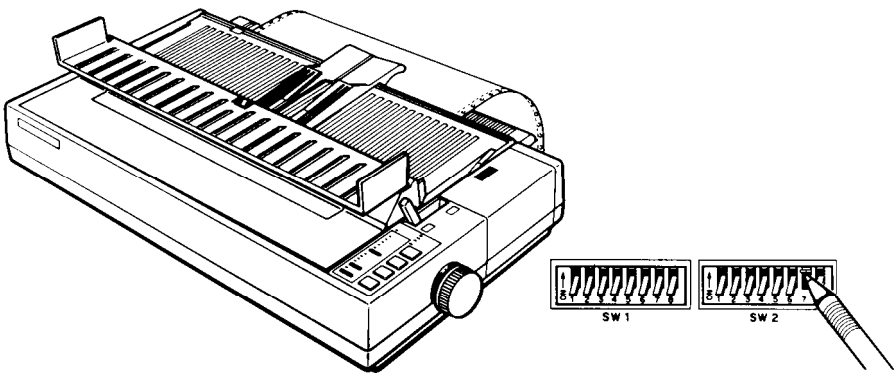
Once you have adjusted your paper, the printer remembers this new loading position. When the printer receives data, the MULTI-PART light stops flashing.

Using Short Tear-off

When you are finished printing, the short tear-off feature automatically feeds the perforation of the continuous paper to the tear-off edge of the printer cover so that you can tear off the last sheet. When you resume printing, the paper feeds backward to the loading position. This feature lets you save the paper normally lost between documents.

Note: You can use the tear-off feature only with the built-in tractor feeding system.

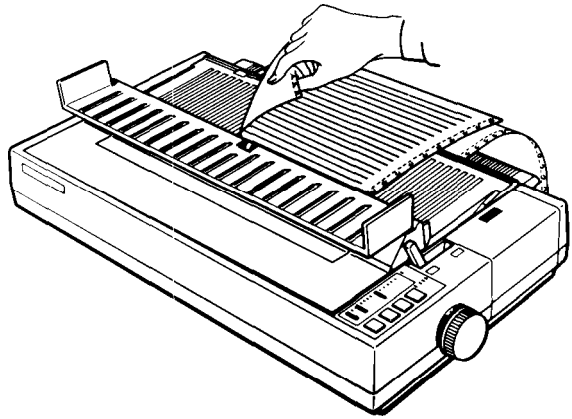
To use this feature, set DIP switch 2-7 to on. Then load continuous paper in the normal way. Leave the paper guide cover open so that you can use the cover's tear-off edge.



You can leave the short tear-off feature turned on (DIP switch 2-7 on) even when you are using single sheets. When you move the paper release lever to the single-sheet position, the short tear-off feature is disabled.

CAUTION: Never use short tear-off with labels. Otherwise, labels may come off their backing and jam the printer.

When you have finished printing, and if the perforation is at the top of form position, the printer automatically feeds the perforation of the continuous paper to the tear-off edge of the printer cover. You can then tear off the page using the tear-off edge as shownbelow.



If the page perforation is not properly aligned with the tear-off edge, you can adjust the tear-off position using micro-adjustment, as described below.

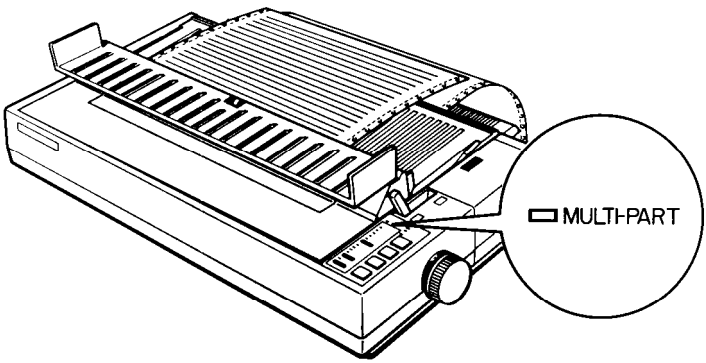
Note: Short tear-off is performed whenever the printer receives a full page of data or a form feed, and no more data is received for three seconds.

When you resume printing after tearing off the sheet, the paper automatically feeds backward to the loading position before printing begins.

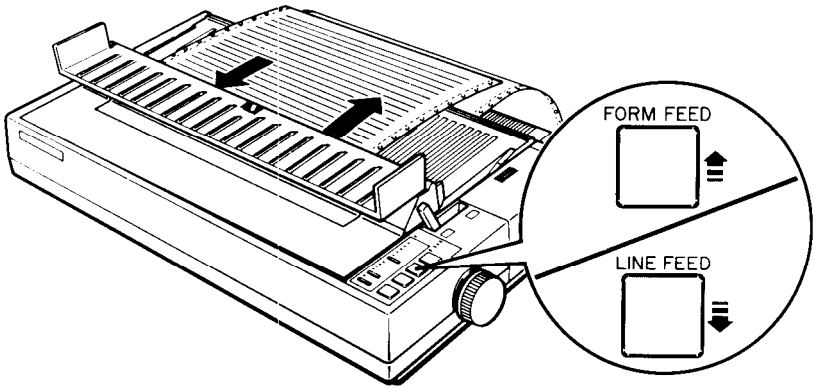
Adjusting the Tear-off Position

If the paper's perforation does not meet the tear-off edge, follow these steps to adjust the tear-off position.

1. Make sure the printer feeds the paper to the tear-off position after printing the document. The MULTI-PART light should begin blinking, indicating that you can now use the micro-adjustment feature to make fine adjustments to the tear-off position.



2. To make fine adjustments to the tear-off position, press the FORM FEED button to feed the paper forward or the LINE FEED button to feed it backward.



You can now tear off your document from the perforation and resume printing. The printer remembers this new tear-off position even after the printer is turned off and on again.

Selecting an International Character Set

International character sets provide you with characters and symbols used in other languages. You can select one of eight international character sets by changing the DIP switch settings.

Whenever the printer is turned on, reset, or initialized, the character set selected by the DIP switches becomes the default character set.

To select an international character set, set DIP switches 1-1, 1-2, and 1-3 according to the table below. DIP switch 14 must be off.

This table also shows the characters that differ in each international character set.

	Country	ASCII code hex												DIP SW		
		23	24	40	5B	5C	5D	5E	60	7B	7C	7D	7E	1-1	1-2	1-3
0	U.S.A.	#	$	@	[	\	]	^	`	{	¦	}	~	ON	ON	ON
1	France	#	$	à	°	ç	§	^	`	é	ù	è	¨	ON	ON	OFF
2	Germany	#	$	§	Ä	Ö	Ü	^	`	ä	ö	ü	ß	ON	OFF	ON
3	U.K.	£	$	@	[	\	]	^	`	{	¦	}	~	ON	OFF	OFF
4	Denmark	#	$	@	Æ	Ø	Å	^	`	æ	ø	å	~	OFF	ON	ON
5	Sweden	#	¤	É	Ä	Ö	Å	Ü	é	ä	ö	å	ü	OFF	ON	OFF
6	Italy	#	$	@	°	\	é	^	ù	à	ò	è	ì	OFF	OFF	ON
7	Spain I	₧	$	@	¡	Ñ	¿	^	`	¨	ñ	}	~	OFF	OFF	OFF

Note: To change the setting of a DIP switch, first turn off the printer, change the DIP switch setting, and then turn the printer back on.

In addition to the eight character sets shown on the previous page, the seven international character sets that follow can be selected with a software command, ESC R. For more information, see the Command Summary in Chapter 9.

Country	ASCII code hex											
	23	24.	40	5B	5C	5D	5E	60	7B	7C	7D	7E
8 Japan	#	$	@	[	¥	]	^	`	{	¦	}	~
9 Norway	#	¤	É	Æ	Ø	Å	Ü	é	æ	ø	å	ü
10 Denmark II	#	$	É	Æ	Ø	Å	Ü	é	æ	ø	å	ü
11 Spain II	#	$	á	¡	Ñ	¿	é	`	í	ñ	ó	ú
12 Latin America	#	$	á	¡	Ñ	¿	é	ü	í	ñ	ó	ú
13 Korea	#	$	@	[	₩	]	^	`	{	¦	}	~
64 Legal	#	$	§	°	'	"	¶	`	©	®	†	™

Once you set the DIP switches for a certain character set, that set remains valid even after you turn off, reset, or initialize the printer. Software commands, however, override the DIP switches settings until the commands are canceled or the printer is turned off, reset, or initialized.

Choosing a Character Set

DIP switch 1-4 selects either the italic character set or a graphics character set. The graphics character sets contain international accented characters, Greek characters, mathematic symbols, and character graphics for printing lines, comers, and shaded areas.

If you have an IBM® or IBM-compatible computer, select a graphics character set when you wish to print character graphics as they are displayed on the screen. Even if you select a graphics character set, you can still print ordinary text and italics. For italics, see your software manual or the description of the ESC 4 command in the Command Summary, Chapter 9.

Note: In most cases, a graphics character set is the preferred selection.

To select either the italics or a graphics character set, set DIP switch 1-4 according to the table below.

Character set	DIP SW 1-4
Italics	Off
Graphics	On

Note: To change the setting of a DIP switch, first turn off the printer, change the DIP switch, and then turn the printer back on.

You can also select the italics character set or a graphics character set using the ESC t command. See the Command Summary in Chapter 9.

When DIP switch 1-4 is on, the graphics character set is determined by the settings of DIP switches, 1-1,1-2, and 1-3.

Graphics character set	SW 1-1	SW 1-2	SW 1-3
PC 437 (United States) Epson Extended Graphics	On	On	On
PC 850 (Multilingual)	On	On	Off
PC 860 (Portugal)	On	Off	On
PC 863 (Canada-French)	On	Off	Off
PC 865 (Norway)	Off	On	On

The graphics character sets are also called code page tables.

Sample printouts of the italic character set and the graphics character sets are shown in the Appendix.

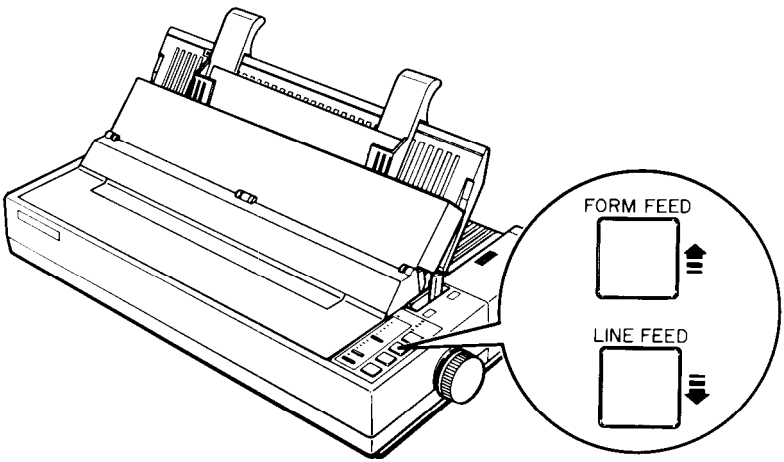
Note: When DIP switch 1-4 is off, DIP switches 1-1, 1-2, and 1-3 select an international character set.

Using the Data Dump Mode

The data dump mode is a special feature that makes it easy for experienced users to identify the cause of communication problems between the printer and application programs. The data dump mode gives a printout of the codes reaching the printer.

To use the data dump mode, follow these steps:

1. Make sure that the printer is loaded with either single-sheet or continuous paper.
2. If the printer is on, switch it off; then hold down the FORM FEED and LINE FEED buttons at the same time you turn on the printer.

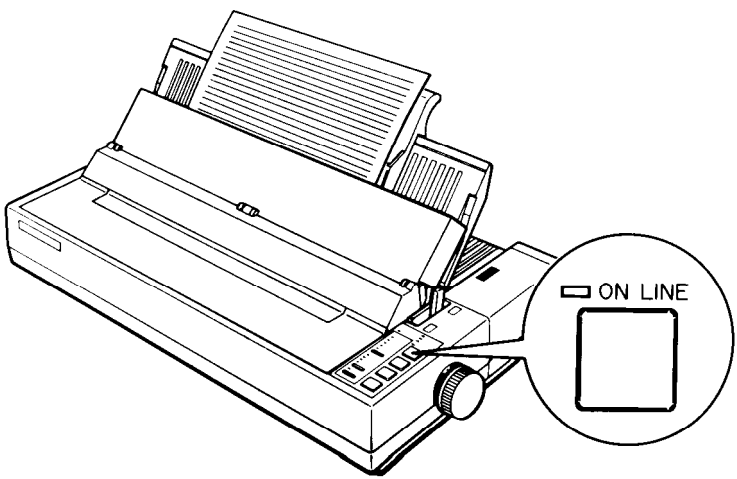


3. Run any program that causes the printer to print (either an application program or one in any programming language). Your printer prints out all the codes sent to the printer, as shown below. (In order to print the last line, you will have to take the printer off line.)

```
1B 40 1B 52 00 1B 74 01 1  1B 50 1B 70 00 20    .@.R..t..6.P.p.
20 20 54 68 69 73 20 69 7    61 6E 20 65 78 61      This is an exa
6D 70 6C 65 20 6F 66 20 6    64 61 74 61 20 64    mple of a data d
75 6D 70 20 6F 72 69 6E 7    75 74 2E 20 54 68    ump orintout. Th
69 73 20 66 65 61 74 75 7    20 6D 61 6B 65 73    is feature makes
20 69 74 20 65 61 73 79 2    6F 72 20 2E 2E 2E      it easy for . . .
```

On the left side of the printout all the codes are printed in hexadecimal format. On the right side of the printout all printable characters are printed, and others, such as control codes, are represented by dots.

4. To turn off the data dump mode press ON LINE to take the printer off line. Then turn off the printer. (You can also cancel the data dump mode by sending an INIT signal from the computer.)



By comparing the characters printed in the text field on the right side of the data dump printout with the printout of hex codes, you can check which codes are being sent to the printer.

To interpret the data dump printout, examine the first three hex codes on the second line of the printout sample (20 20 54). Each hex code 20 represents a space; hex code 54 represents the letter T. Check the second line of the text field on the right side of the printout and you will find the letter T preceded by two spaces.

The chart below interprets the first eight codes.

Hex **codes**	**Command**	**Function**
1B 40	ESC @	Initialize printer
1B 52 00	ESC R0	Select USA character set
1B 74 01	ESCt1	Select PC 437 (Epson Extended Graphics)

Chapter 4
Software and Graphics

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Enhancing Your Printing

You can obtain a wide variety of printing effects with your printer from changing the number of characters per inch to using special effects on selected words and phrases. This section gives you a sampling of the features you may select with your software.

For software control of these features, see the instructions for your application programs or look up their specific commands in the Command Summary in Chapter 9.

Print Quality and Fonts

The printer has three levels of print quality: SuperDraft, normal draft, and Letter Quality (LQ). Draft printing speeds are controlled by DIP switch 1-6.

SuperDraft is ideal for rough drafts and large documents or reports that you need to print quickly. Normal draft takes a bit longer but offers higher resolution characters. Finally, Letter Quality takes even longer, but produces darker, more fully-formed characters suitable for presentation-quality documents.

For Letter Quality printing, the printer offers nine fonts. See Chapter 3 for information on the fonts and how to select them.

Note: SuperDraft is available only with 10 cpi printing. Underlining and double-width printing can be combined with SuperDraft. If other enhancements or character spacings are selected, the printer switches to normal draft speed. SuperDraft resumes again after the features are turned off.

Character Spacing

To add greater variety to your documents, the printer has three cpi spacings, as well as proportional spacing. Each one can be selected with a software command.

See Chapter 8 for a table that shows which character spacings are available for each font. You cannot combine normal draft mode with proportional spacing, and SuperDraft mode is available only in 10 cpi printing.

The printout below compares the three spacings:

```
This is 10 cpi printing.
This is 12 cpi printing.
This is 15 cpi printing.
```

As shown above, 15 cpi characters are only about two-thirds the height of 10 and 12 cpi characters. This makes 15 cpi particularly useful when you want to separate certain material from the main text.

In fixed cpi spacing each character is given the same amount of space. The width of proportional characters, however, varies from character to character. For example, a narrow letter like i takes less space than a wide letter like W. The width of each proportional character is given in the Appendix.

The following printout compares 10 cpi spacing with proportional spacing:

This is 10 cpi printing.
This is proportional spacing.

Note: Proportional spacing is not available in the draft mode.

See the Print Size and Character Width commands in Chapter 9.

Character Size

In addition to the basic cpi spacings and proportional spacing, the printer offers three other modes that can change the size of your printing. These modes are double-wide, double-high, and condensed.

The double-wide mode doubles the width of any size character, while the double-high mode doubles the height of any size character. These modes are useful for emphasizing document titles and headings in reports, but are usually not suitable for large amounts of text. These modes can also be combined to obtain even more impressive printing results.

This is normal 10 cpi printing.
T h i s i s d o u b l e — w i d t h .
This is double-height.
This is double-width and double-height.

Both 10 and 12 cpi printing and proportional spacing can be reduced to about 60 percent of their normal width using the condensed mode. This mode is particularly useful for printing wide spreadsheets because condensed 12 cpi printing allows you to print up to 160 characters on an 8-inch line.

The condensed mode can be selected with a software command, or by using SelecType (See Chapter 3). Even if you turn the condensed mode on with SelecType, you can still turn it off with a software command.

Condensed 10 cpi gives you many characters on & line,
Condensed 12 cpi giver even lore,

Widening or narrowing the characters also widens or narrows the spaces between words. Because word processors usually create a left margin by printing spaces, you may need to change the left margin and the number of characters on a line to keep the margins correct if you change character widths.

Note: You cannot condense 15 cpi.
SuperDraft temporarily switches to normal draft speed when you select condensed printing.

See the Print Size and Character Width commands in Chapter 9.

Special Effects and Emphasis

The printer offers two ways of emphasizing text and also allows you to use underlining, superscripts, subscripts, and italics. You can directly control these features using software commands. Many application programs can also produce some of these effects. See your application program manual for details.

Emphasized and double-strike printing

Emphasized and double-strike printing can give words and phrases added prominence. In emphasized mode, the printer prints each character twice as the print head moves across the paper, with the dots in the second pass printed slightly to the right of the first pass. This process produces darker, more fully formed characters.

In double-strike mode, the print head prints each line twice, making the text bolder. For even greater boldness, you can combine emphasized and double-strike. The following samples show the different effects you can achieve using these modes alone and in combination.

This is ROMAN printing.
This is ROMAN, emphasized.
This is ROMAN, double-strike.
This is ROMAN, with both.

Note: SuperDraft temporarily switches to normal draft speed when you select emphasized or double-strike printing. See the ESC E and ESC G commands in Chapter 9.

Italic printing

You can print italics by using the ESC 4 software command (See Chapter 9). This is true no matter how DIP switch ***1-4*** is set.

This is ROMAN printing.
This is ROMAN italics.

Underlining, strike-through, and overlining

The underline, strike-through, and overline modes are useful for highlighting selected text. This feature can be used to score spaces, subscripts, and superscripts without a break You can choose from a variety of line styles, including single, double, broken, or continuous. See the ESC (- command in Chapter 9 for more information.

This is continuous underlining.

This is double strike-through.

This is broken overlining.

Superscripts and subscripts

Superscripts and subscripts can be used for printing footnote numbers and mathematical formulas. The example below shows underlining and subscripts combined in a mathematical formula. See the ESC S command in Chapter 9 for more information.

$$\text{average} = \frac{(a1 + a2 + \ldots\ldots\ldots\ldots + an)}{n}$$

Outline and shadow

The outline and shadow features are useful for adding variation and emphasis to text that you wish to stand out, such as headings. The following samples show the outline and shadow features individually, plus a combination of outline with shadow. See the ESC q command in Chapter 9 for more information.

This is outline style.
This is shadow style.
This is outline with shadow.

Selecting Typestyles With Master Select

Your printer has a special ESCape code called Master Select that allows you to choose many combinations of these **nine** modes: 10 cpi, 12 cpi, proportional spacing, condensed, emphasized, double-strike, double-wide, italics, and underline. For more information on sending ESCape codes to your printer, see Chapter 9.

The format of the Master Select code is shown below:

ASCII:	ESC	!	n
Decimal:	27	33	n
Hexadecimal:	1B	21	n

The variable *n* is a number that identifies the mode or combination of modes. To find the value of n, use the following table to add up either the decimal or hexadecimal numbers for the features you want.

Feature	Dec.	Hex.
10cpi	0	00
12cpi	1	01
proportional	2	02
condensed	4	04
emphasized	8	08
double-strike	16	10
double-wide	32	20
italics	64	40
underline	128	80

For example, to print a title you may want to use double-wide 12 cpi characters printed in the double-strike mode. You would add three numbers together to calculate the value of *n*.

12cpi	1
Double-strike	16
Double-wide	32
	n = 49

After calculating the value of *n*, you use the Master Select command to send the value to the printer.

ASCII:	ESC	!	1
Decimal:	27	33	49
Hexadecimal:	1B	21	31

The print quality and font must be set separately, using SelecType or the ESC x and ESC k commands. There are two more things to consider when using the Master Select command:

- Master Select cancels any of the other listed features that you do not set. For example, if you have already set a different character width and you use Master Select to set emphasized double-strike, the character width is reset to 10 cpi.
- Proportional spacing overrides 10, 12, and 15 cpi.

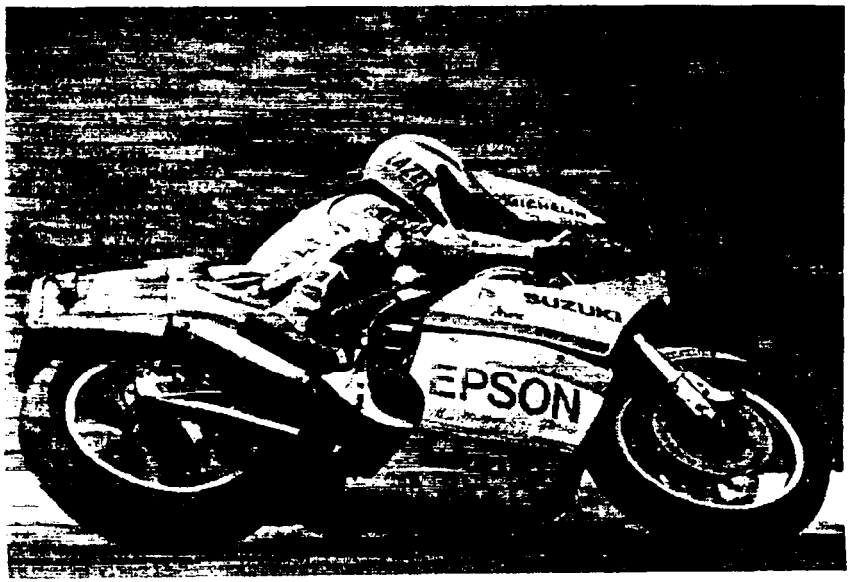
Graphics

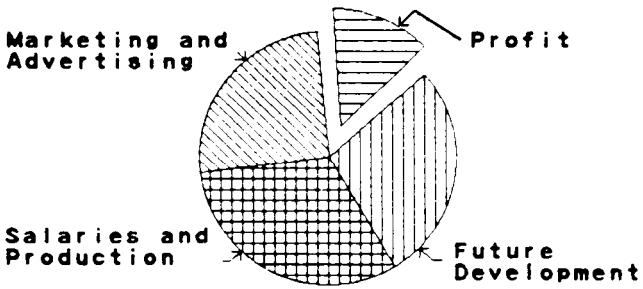
The dot graphics mode allows your printer to produce pictures, graphs, charts, or almost any other pictorial image you can create.

Because many commercial software programs use graphics, you may be able to print pictures and graphs like the ones on this page and the next by simply giving your software a few instructions.

The quickest and easiest way to print graphics on your printer is to use a commercial graphics program. With such programs you usually create an image on your monitor, then give a command to send the image to the printer.

If you use commercial software that produces graphics, all you need to know about dot graphics is how to use the software. The application program will take care of the printer. (Some programs call this bit image printing.) On the other hand, if you wish to do your own programming or merely wish to understand how this printer prints graphics, read on.





The Print Head

To understand dot graphics you need to know a little about how your printer's print head works.

The print head has 24 pins. As the print head moves across the page, electrical impulses cause the pins to fire. Each time a pin fires, it strikes the inked ribbon and presses it against the paper producing a small dot. As the print head moves along, the pins fire time after time in different patterns forming letters, numbers, and symbols.

Because the dots overlap each other both horizontally and vertically in Letter Quality mode, it is difficult to see the individual dots. Instead, the letters and symbols seem to be made up of unbroken lines.

In order for the dots to overlap vertically, the pins in the print head are in more than one column, but the intelligence of the printer handles the timing of pin firings so that the effect is that of 24 pins arranged in a single vertical column.

Dot patterns

The print head is able to print graphics, as well as text because graphic images are formed on the printer in about the same way that pictures in newspapers and magazines are printed. If you look

closely at a newspaper photograph, you will find that it is made up of thousands of small dots. Your printer also forms its images with patterns of dots, as many as 360 dots per inch, horizontally and 360 dots per inch, vertically. The images printed by this printer can, therefore, be as finely detailed as the ones at the beginning of this section.

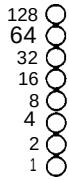
Twenty-four-pin graphics

The graphics mode that takes full advantage of this printer's print head is 24-pin graphics. This mode has five densities, but for simplicity this explanation deals with only one of them, triple-density.

Triple-density prints up to 180 dots per inch, horizontally. As the print head moves across the paper, every 1/180th of an inch it must receive instructions about which of its 24 pins to fire. At each position it can fire any number of pins, from none to 24. This means that the printer must receive 24 bits of information for each column it prints. Since the printer uses 8-bit bytes of information in communicating with the computer, it needs three bytes of information for each position.

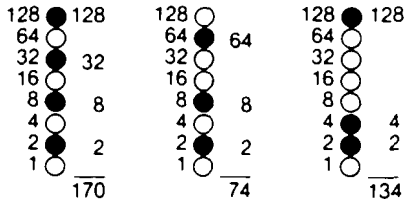
Pin labels

To tell the printer which pins to fire in each column, you first divide each of the vertical columns into three sections of eight pins each and consider each section separately. Since there are 256 possible combinations of the eight pins in each section, you need a numbering system that allows you to use a single number to specify which of the 256 possible patterns you want. This numbering system is shown below:



To fire any one pin, you send its number to the printer. To fire more than one pin at the same time, add up the numbers of the pins and send the total. Using these labels for the pins, you fire the top pin by sending 128. To fire the bottom pin, you send 1. If you want to fire only the top and bottom pins, you simply add 128 and 1, and send 129.

By adding the appropriate label numbers together, you can fire any combination of pins. Below are three examples of how to calculate the number that will fire a particular pattern of pins.



With this numbering system, any combination of the eight pins adds up to a decimal number between 0 and 255, and no numbers are duplicated.

Because there are 24 pins in each column, you must make a calculation for each of the three sections in each column. As you can see, this method of planning and printing dot graphics requires considerable calculation. Because triple-density uses 180 columns per inch, printing a single line of triple-density graphics only one inch long requires 540 numbers. Fortunately, commercial graphics software is available to do these calculations for you.

Before you can put these numbers into a graphics program, however, you need to know the format of the graphics command.

The Graphics Command

The graphics mode command is quite different from the other commands used by the printer. For most of the other printer modes, such as emphasized and double-wide, one ESC code turns the mode on and another turns it off. For graphics, the command is more complicated because the code that turns on a graphics mode also specifies how many columns it will use. After the printer receives this code, it interprets the numbers that follow as pin patterns and prints them on the paper.

Your printer has one command that allows you to use any of the 11 graphics options. The format of the command is:

ESC * *m n1 n2* data

In this command, *m* selects the graphics option and *n1* and *n2* specify the number of columns to reserve for graphics. The available graphics options are listed below:

Option	Pins	m	Horiz. density Dots/in.
Single-density	8	0	60
Double-density	8	1	120
High-speed double-density*	8	2	120
Quadruple-density*	8	3	240
CRT I	8	4	80
CRT II	8	4	90
Single-density	24	31	60
Double-density	24	33	120
CRT III	24	38	90
Triple-density	24	39	180
Hex-density*	24	40	360

• Adjacent dots cannot be printed in this mode.

Column Reservation Numbers

The graphics command requires more than one number to specify how many columns to reserve because one line can use thousands of columns, but the printer does not use numbers larger than 255 in decimal. Therefore the graphics mode command uses two numbers, *n1* and *n2,* for reserving columns.

To find *n1* and *n2,* divide the total number of columns by 256. The result is *n2;* the remainder is *n1.* Since the command is set up for two numbers, you must supply two even if you need only one. When you need fewer than 256 columns, just make *n1* the number of columns you are reserving and make *n2* a zero.

For example, if you wish to send 1632 columns of graphics data, *n1* should be 96 and *n2* should be 6 because 1632 = 96 + (6 x 256).

The printer interprets the number of bytes specified by *n1* and *n2* as graphics data, no matter what codes they are. This means that you must be sure to supply enough bytes of graphics data or the printer will stop and wait for more data and will seem to be locked. If, on the other hand, you supply too much graphics data, the excess will be interpreted and printed as regular text.

A Simple Graphics Program

This first program is just a simple example to show you how the graphics command, column reservation numbers, and data can be used in a BASIC program.

Type in and run the following program. Be especially careful to include both semicolons. The program produces the printout you see below:

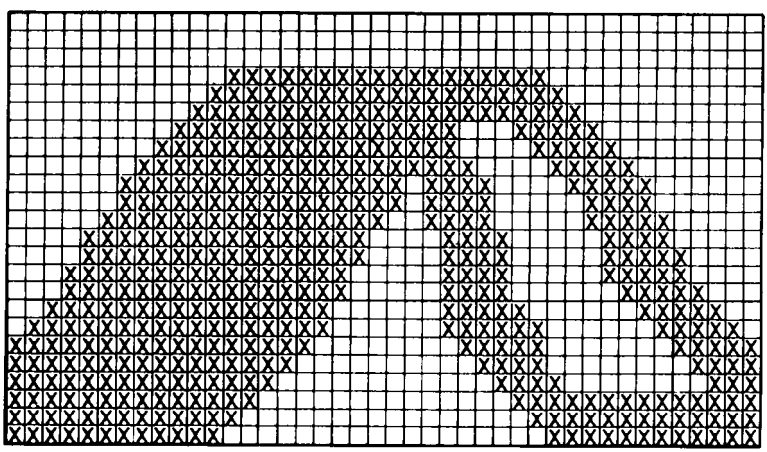
```
10 WIDTH   "LET:".255
20 LPRINT   CHR$(27)"*"CHR$(32)CHR$(40)CHR$(0);
30 FOR X-1 TO 120
40 LPRINT  CHR$(170);
50 NEXT X
```

Line 20 selects single-density 24-pin graphics mode (mode 32) and also reserves 40 columns for graphics. Since 24-pin graphics requires three bytes of data for each column, line 30 begins a loop to supply 120 bytes of data. Line 40 contains the number 170, which produces the first pin pattern shown in the section on pin labels, and line 50 ends the loop.

Designing Your Own Graphics

With what you know now, you can use the simplest application of graphics—calculating by hand the data to print the graphic image. While this method is the most tedious, it helps you understand dot graphics. It is also useful for small graphic elements that are used many times.

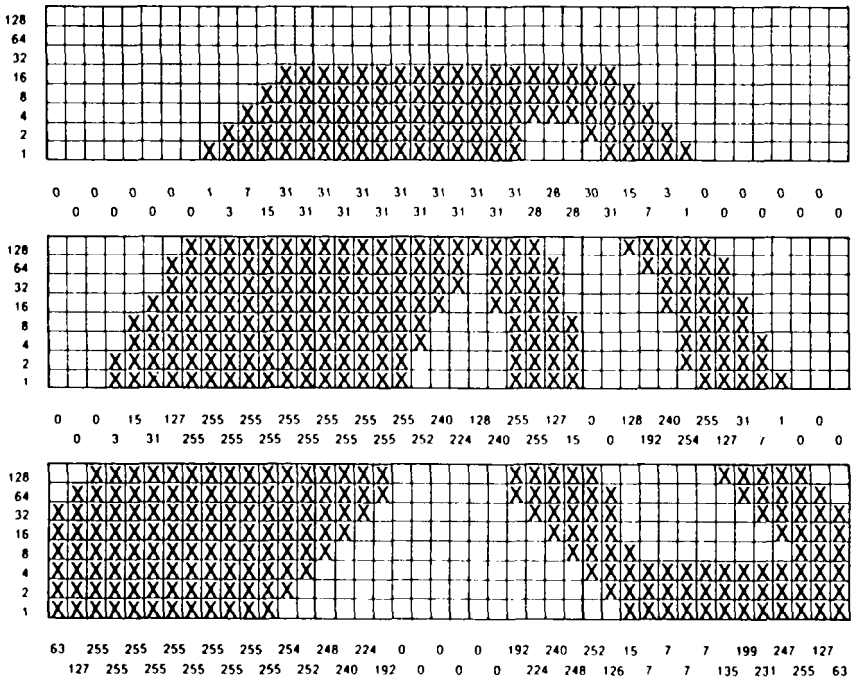
The illustration below shows how you can use a grid on paper to plan where you want dots to be printed. This grid is for a single line of graphics 42 columns long. Since each line of 24-pin graphics is approximately 1/8th of an inch high and since triple-density graphics prints 180 dots per inch, horizontally, a design planned on this grid will be about 1/8th of an inch high and less than 1/4th of an inch wide.



The actual pattern that the printer prints on the paper is, of course, made up of dots that overlap each other both vertically and horizontally. The reason the planning grid uses an x for each dot is that using an accurate representation of the dots makes calculating the data numbers difficult because they cover each other. Therefore, remember that each x represents the center of a dot, and the dots actually overlap.

Write the assigned values of the pins next to your design, then total the values for each column of dots. These totals are the values that you send to the printer as graphics data to print the design.

Below is the same grid divided into three sections to make the data calculation easier. At the bottom of each section of each column is the total of the pin numbers for that section. This gives you the total of 126 data numbers necessary to print this small figure.



Below is the BASIC program that prints the design shown on the previous pages. Note that the data numbers in lines 80 through 140 are the same numbers that are at the bottom of each section in the last illustration. The WIDTH statement in line 10 is for IBM PC BASIC; the WIDTH statement format may be different for your system.

```
10  WIDTH  "LPT1:",255
20   LPRINT   CHR$(27)"*"CHR$(39)CHR$(42)CHR$(0):
30 FOR  X-1  TO  126
40 READ  N
50  LPRINT  CHR$(N);
60 NEXT  X
70  LPRINT
80   DATA   0,0,63,0,0,127,0,0,255,0,3,255,0,15,255,0,31,255
90  DATA  0,127,255,0,255,255,1255,3,255,255,7,255,255,15,
   255,255
l00   DATA   31,255,254,31,255,252,31,255,248,31,255,240,31,255,
   224,31,255,192
110   DATA   31,255,0,31,252,0,31,240,0,31,224,0,31,128,0,31,240,0
120   DATA   31,255,192,28,255,224,28,127,240,28,15,248,30,0,252,
   31,0,126
130   DATA   15,128,15,7,192,7,3,240,7,1,254,7,0,255,7,0,127,135
140   DATA   0,31,199,0,7,231,0,1,247,0,0,255,0,0,127,0,0,63
```

In this program, line 20 assigns the graphics option (24-pin triple-density) with code 39. Code 42 sets the number of pin columns at 42. Lines 80 through 140 contain 126 bytes of data (42-pin columns x 3 bytes) for each pin column. Lines 30 through 60 print the design that you see below:

Notice that the dots overlap quite a bit. This design was printed using the triple-density, 24-pin graphics option because the density is the same (180 dots per inch) in both directions.

Adding the following lines to the preceding program causes the pattern to print 10 times in a row as shown below:

```
15 FOR C=l TO 10; RESTORE
65 NEXT  C
```

Individual graphics option commands

There are four individual graphics option commands that are very much the same as the ESC * command, but each one works for only one graphics option. All these commands are for 8-pin graphics options. Note that the commands contain one less variable than the ESC * command because they don't need to select a graphics option.

The commands are shown below:

Command	Function	ESC . format
ESC K	Single-density	ESC*0
ESC L	Double-density	ESC*1
ESC Y	Double-density, high-speed	ESC*2
ESC Z	Quadruple-density	ESC*3

Because of a difference in line spacing increments, the shape of graphics figures produced **on** the printer with an 8-pin option is different from the output from the **same** program on a 9-pin printer.

The reassigning command

The LQ-850 and LQ-1050 have a command that allows you to change the graphics option assigned to any of the four individual graphics option commands.

The command looks like this:

ESC ? s m

The letters represents the command that you wish to change the assignment for (K, L, Y, or Z) and m is the number of the graphics option that you want to assign to it. For example, to change the ESC K command to use the CRT I graphics option, the command in BASIC is:

```
LPRINT CHR$ (27);"?";"K";CHR$(4)
```

This is a quick way to change the aspect ratio of the design that you are printing. Changing the graphics option will change the width without changing the height. You should, however, make this change with caution.

If you change one of the S-pin graphics options to a 24-pin graphics option without changing the program that supplies the graphics data, you will print garbage (if the program prints at all). Remember, the 24-pin graphics options require three times as much graphics data as the 8-pin graphics options.

User-defined Characters

With this printer, it is possible to define and print characters of your own design. You can design an entirely new alphabet or typeface, create special characters for use as mathematical or scientific symbols, or create graphic patterns with user-defined characters to serve as building blocks for larger designs.

Below, you can see samples of typefaces created with the user-defined character function.

You can make the task of defining characters easier by using a commercial software program that assists you in creating characters or simply supplies you with sets of characters already created. Also, some popular software programs make use of the printer's user-defined character function to enhance printouts. (These characters are called download characters in some programs.)

The standerd ASCII characters are stored in the printer's Read Only Memory (ROM), and the user-defined characters are stored in the printer's Random Access Memory (RAM).

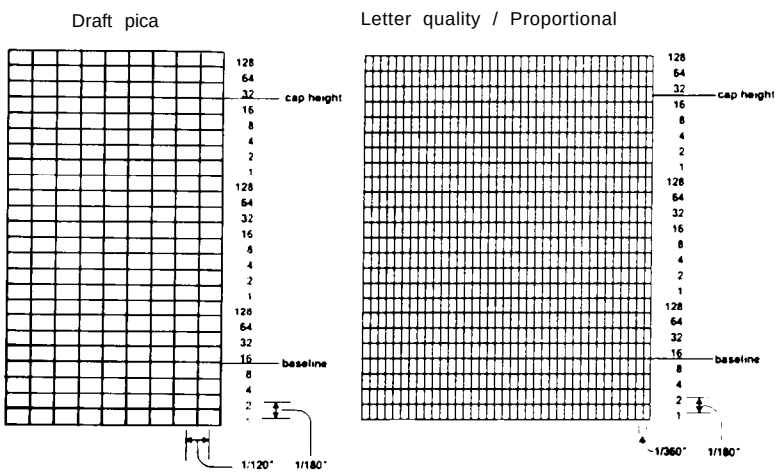
Designing Your Characters

User-defined characters are like dot graphics because you send the printer precise instructions on where you want each dot printed. In fact, planning a user-defined character is like planning a small dot graphics pattern.

Design grids

To design a character you use a grid that is 24 dots high-one dot for each pm on the printer's print head. The width of the character matrix depends on the character set in use. For draft characters, the grid is nine dots wide, for Letter Quality it is 29 dots wide, and for proportional characters it is 37 dots wide. The dots for both Letter Quality and proportional characters are spaced more closely together than those for draft characters.

The illustrations below show the two design grids. The line at the side, labeled cap, indicates the top of a standard capital letter. The line labeled base indicates the baseline for all letters except those with descenders (the bottom parts of such letters as j and y). The bottom row is usually left blank because it is needed for underlining.



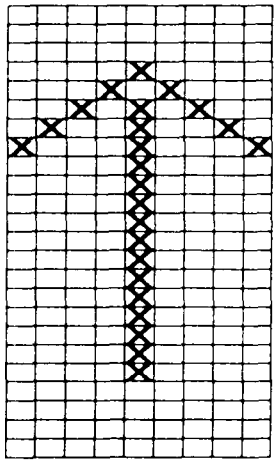
The grid on the right side can be used for either Letter Quality or proportional characters. For Letter Quality you do not use all the columns.

There is one restriction in designing characters. Dots in the same row may not print in adjacent columns. This means that there must be an empty dot position both to the left and right of each dot that prints. This is true in draft, Letter Quality, and proportional mode.

Defining Your Characters

The first step in defining characters is to place the dots on a grid just as you want them to print. The examples shown here, like the ones in the graphics section, use an x to represent each dot.

In the illustration below, you see a draft grid with a simple user-defined character planned on it.



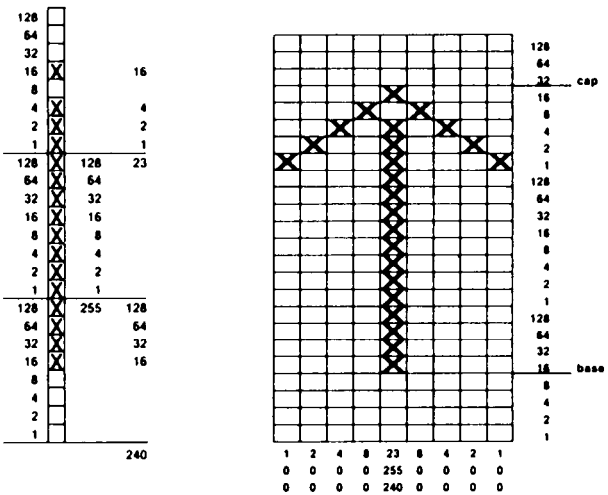
Now you translate the dot pattern you've created on paper to a numeric format so you can send the data to your printer. Every dot has an assigned value. Each vertical column (which has a maximum of 24 dots) is first divided into three groups of eight dots. Each group of eight dots is represented by one byte, which consists of eight bits. Hence, one bit represents one dot.

Data numbers

The bits within each byte have values of 1, 2, 4, 8, 16, 32, 64, and 128. In the vertical column of dots, the bits are arranged so that the most significant bit (with a value of 128) is at the top of the column and the least significant bit (with a value of 1) is at the bottom.

The next illustration shows how to use this method to calculate the data numbers for the character in this example. On the left side of the figure, the data numbers are calculated for the middle column. The value of each byte is calculated by adding the values of the rows in which dots appear. The right side of the figure shows the whole character with the three data numbers for each column indicated at the bottom.

This manual uses decimal numbers because the program examples are written in BASIC and everyone is familiar with decimals. The data you send to your printer, however, must be in the form (binary, decimal, hexadecimal) that you can use with your programming language.



You have seen how to design a character by placing dots on a grid and translating the dots to decimal equivalents. The last step in defining a character is sending this information to your printer.

Sending Information to Your Printer

The printer loads characters in the print style (Letter Quality, draft, or proportional) that the printer is currently using. It also records whether italic, superscript, or subscript is turned on. This means that if you want to print a character in italics, for example, you must have the italic mode turned on when you define the character.

The command your printer uses to define characters is one of the most complex in its repertoire. The format of the command is this:

ESC & 0 nl n2 d0 dl d2 data

The ESC & is simple enough. The 0 (which is ASCII code 0, not the numerical zero in quotation marks) allows for future enhancements. At this time, it is always ASCII 0.

You can define many characters with a single command. The values nl and n2 are the ASCII codes of the first and last characters you are defining. If you are defining only one character, nl and n2 are the same. You can use any codes between decimal 32 and 127 for n1 and ***n2,*** but it is best not to define decimal 32, which is the code for a space. Also, you can use letters in quotation marks instead of ASCII codes for ***nl*** and n2.

An example will show how to specify nl and n2. For instance, if you wanted to redefine the characters A through Z, nl would be A (or ASCII code 65) and n2 would be Z (or ASCII code 90). So the command ESC & 0 AZ (followed by the appropriate data) would replace the entire alphabet of capital letters.

Following the specification of the range of characters to be defined in this command are three data bytes, d0, dl, and ***d2,*** that specify the width of the character and the space around it. The left space (in dot columns) is specified by ***d0,*** and the right space is specified by ***d2.*** The second byte, ***dl,*** specifies the number of columns of dots that are printed to make up the character. By varying the width of the character and the spaces around it, you can create proportional-width characters that print at draft speed. The table below shows the maximum values for these bytes.

Mode	d1	*d 0 + d l + d 2*
Draft	9	12
Letter Quality 10 cpi	29	36
Letter Quality 12 cpi	23	30
Proportional	37	42

The last part of the command to define your characters is the actual data that defines the dot patterns for each character. Since it takes three bytes to specify all the dots in one vertical column, your printer expects ***dl*** x 3 bytes of data to follow ***d2.***

This example of a character definition program should make this clear:

```
10  LPRINT  CHR$(27)"x0"
20  LPRINT  CHR$(27)"&"CHR$(0);
30 LPRINT  "@@";
40  LPRINT  CHR$(1)CHR$(9)CHR$(1);
50 FOR I-1 TO 27
60 READ  A:  LPRINT  CHR$(A);
70 NEXT I
80  LPRINT"@@@@@"
90  LPRINT  CHR$(27)"%"CHR$(1);
100  LPRINT  "@@@@@"
110  LPRINT  CHR$(27)"%"CHR$(0);
120  LPRINT  "@@@@@"
130  END
140  DATA  1,0,0,2,0,0,4,0,0
150  DATA  8,0,0,23,255,240,8,0,0
160  DATA  4,0,0,2,0,0,1,0,0
```

In line 10, the ESC x0 command selects draft printing.

The actual character definition starts in line 20. The two @ signs in line 30 represent nl and n2, the range of characters being defined (in this case, a range of 1). Line 40 contains *d0, dl,* and *d2.*

The information about the actual character design (which is contained in the DATA statements at the end of the program) is sent to the printer in the loop between lines 50 and 70.

Note: When defining Letter Quality or proportional characters, put a WIDTH statement in your program to prevent carriage return and line feed codes from interfering with your definitions.

Printing User-defined Characters

If you entered the previous program example, you defined an arrow and placed it in the RAM location for ASCII code 64 (replacing the @ sign). You can now print out a three-line sample of your work. The first and third lines (printed by lines 80 and 120) print the normal @ sign. The second line (printed by line 100) prints out the arrow that you defined.

Run the program to see the printout below:

@@@@@
↑↑↑↑↑
@@@@@

As you can see, both sets of characters (the @ from the original characters in ROM that the printer normally uses and the alternative character you defined) remain in the printer available for your use. The command to switch between the two sets is used in line 90 and 110. It is:

ESC % n

If n is equal to 0, the normal ROM character set is selected (this is the default). If n is equal to 1, the user-defined character set is selected. If you select the user-defined character set before you have defined any characters, the command is ignored and the ROM characters remain in use.

You may switch between character sets at any time-even in the middle of a line. To try this, place semicolons at the end of lines 80 and 100 in the program example.

Copying ROM Characters to RAM

After running the program, if you select the user-defined character set and try to print other characters, the only one that will print is your arrow. Since no other characters are in the printer's user-defined RAM, there is nothing else to print. Other characters sent to the printer do not even print as spaces; it's as if they were not sent at all.

In many cases, you will want to redefine only a few of the characters to suit your needs-the rest of the alphabet will work fine as it is. As you have seen, it is possible to switch back and forth, at will, between the normal character set and your user-defined character set. It is, however, rather inconvenient.

Therefore, your printer has a command that allows you to copy all of the standard characters from ROM to the user-defined character set.

The command format is as follows, where the value of n represents the font family:

ESC: 0 n 0

Note: This command cancels any user-defined characters you have already created. You must send this command to the printer before you define characters.

If you use this command at the beginning of a program, then define your special characters and select the user-defined set, you can print with the userdefined set as your normal character set. You never need to switch back and forth between sets.

Letter Quality Characters

If you select Letter Quality printing with the ESC xl command, you can design user-defined characters using up to 29 columns of the Letter Quality/Proportional grid. The dot columns are spaced closer together horizontally than draft dot columns (the horizontal dot spacing is 1/360th of an inch as opposed to 1/120th of an inch for draft characters).

Proportional mode characters

Selecting the proportional character mode yields user-defined characters of the highest resolution. You can design characters using all 37 columns of the Letter Quality/Proportional grid.

Remember that in Letter Quality and proportional modes, as in draft mode, you cannot place dots in adjacent columns. There must be an empty dot position both to the left and right of each dot that prints.

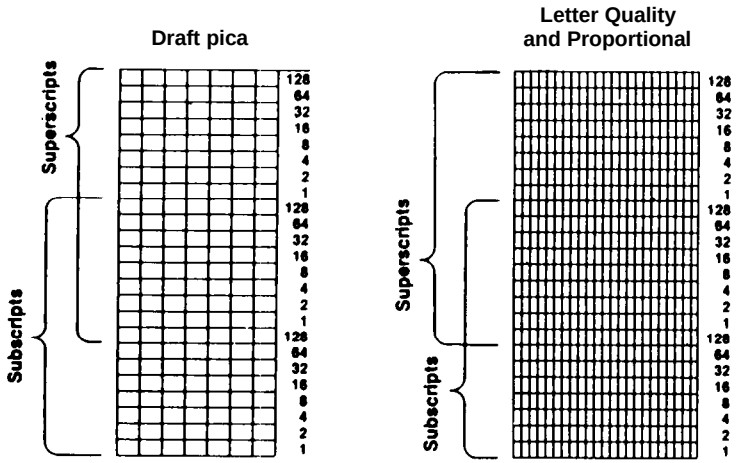
Superscripts and subscripts

You can also create superscript and subscript user-defined characters. Just as Letter Quality characters are defined when the Letter Quality mode is selected, superscript and subscript characters are created when you select either superscript or subscript.

These characters can be used as either superscripts or subscripts. The characters are exactly the same; only their placement is different. The difference between these characters and regular characters is that superscript and subscript characters are smaller. They are a maximum of 16 dots high. Their maximum width in dot columns is shown in the table below:

Mode	*d1*	*d0 + d1 + d2*
Draft	7	12
Letter Quality	23	36
Proportional	23	42

Since superscript and subscript characters are smaller, when you define them you only need two bytes of data for each vertical row of dots. Design grids for these characters are shown in the figure below:



Mixing Print Styles

You can use each of the three userdefined character modes (draft, Letter Quality, and proportional) in combination with most of your printer's various print styles. For instance, emphasized mode works with userdefined characters. The characters you design are enhanced to give this printing effect.

Mixing the three types of userdefined character sets is not possible. For example, if you select draft and define some characters, then select proportional and define some more, the first draft character definitions are deleted. Only one type of character definition may be stored in RAM at any time.

If you define characters in one mode, then switch to another mode and select the user-defined character set, the command is ignored and nothing is printed. The user-defined character definitions, however, remain unaffected. If you switch back to the mode in which they were defined, you can then select and print them.

Keep in mind that user-defined characters are stored in RAM, which is not permanent memory. When the printer power is turned off or the printer is initialized with the $\overline{\text{INIT}}$ signal, the user-defined characters are lost. (Some computers do this each time BASIC is loaded.)

Chapter 5
Using the Printer Options

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The Cut Sheet Feeder

The optional cut sheet feeder makes it possible to handle single-sheet paper more easily and more efficiently. Up to 150 sheets of standard bond paper can be fed automatically into the printer without reloading. You can also feed envelopes using the cut sheet feeder.

You can use the following cut sheet feeders with the printers:

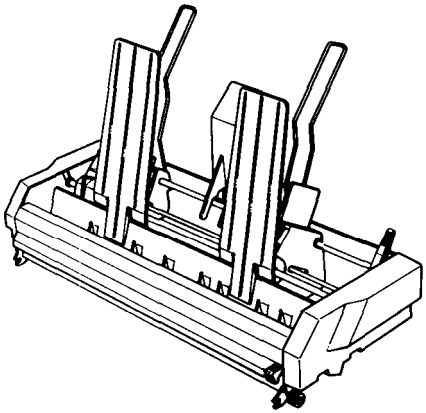
Printer	Single bin	Double bin
LQ-850	#7339	#7346
LQ-1050	#7340	#7348

The double-bin sheet feeders have a front bin (bin 1) and a back bin (bin 2) in which you can store two different types of paper. You select the bin to feed from through the control panel or using a simple command.

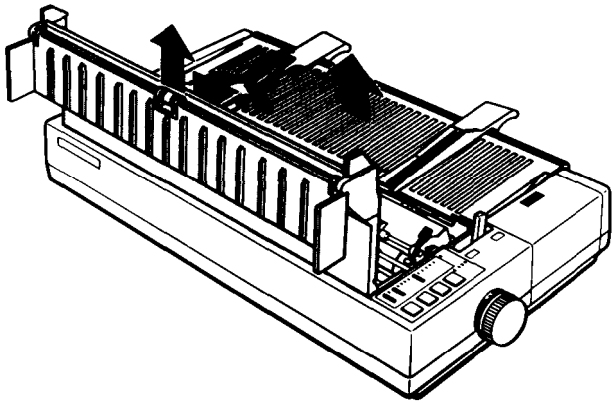
The illustrations in this section show the single-bin feeder for the LQ-1050. You use the other sheet feeders in the same way.

Installation

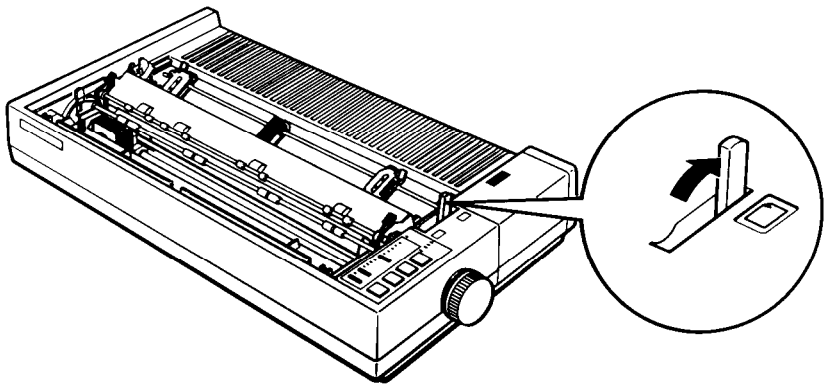
1. Assemble the cut sheet feeder following the instructions provided in its accompanying manual.



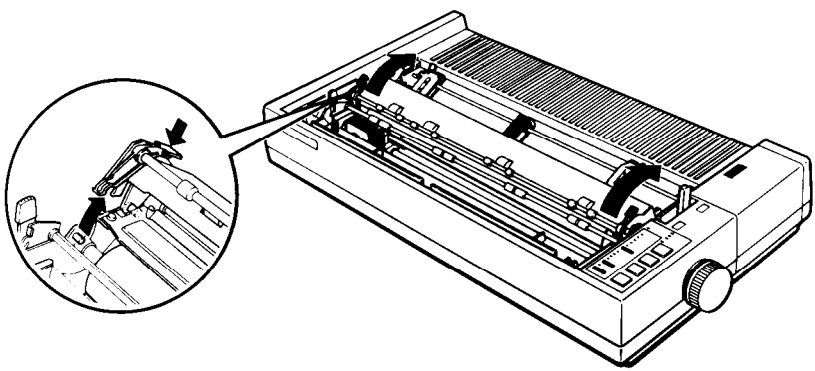
2. Make sure the printer is turned off. Then remove the printer cover unit and the paper guide.



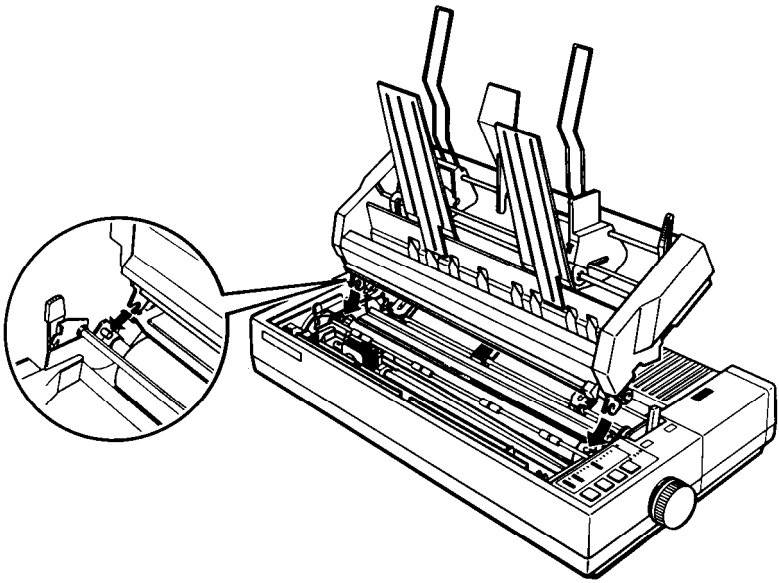
3. Push the paper release lever back to the single-sheet position.



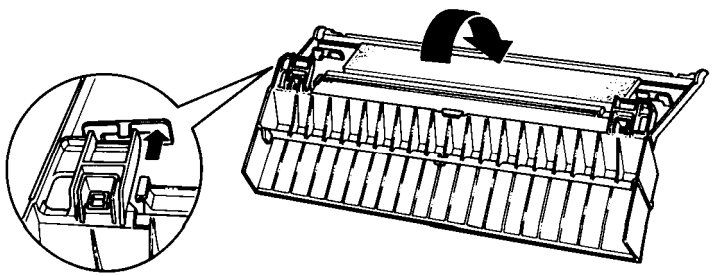
4. Remove the paper tension unit by pressing the levers back to open the mounting latches. At the same time, lift up on the front of the unit.



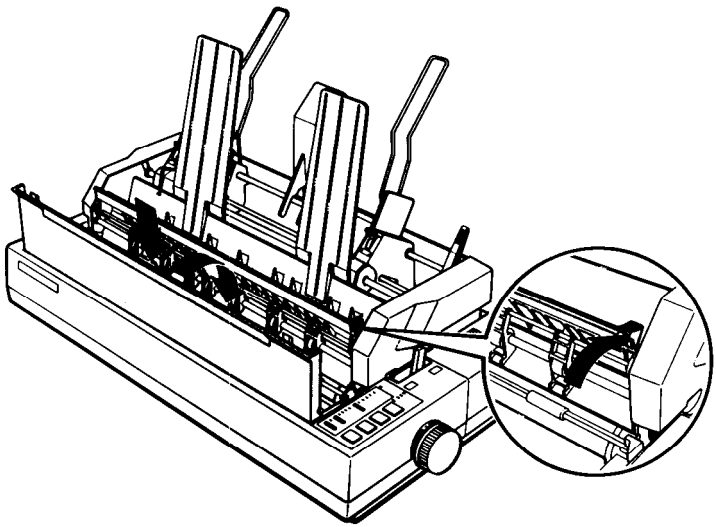
5. Tilt the cut sheet feeder slightly forward to fit the notches at the base of the unit over the pins on the printer. Then tilt the feeder back until it rests on top of the printer.



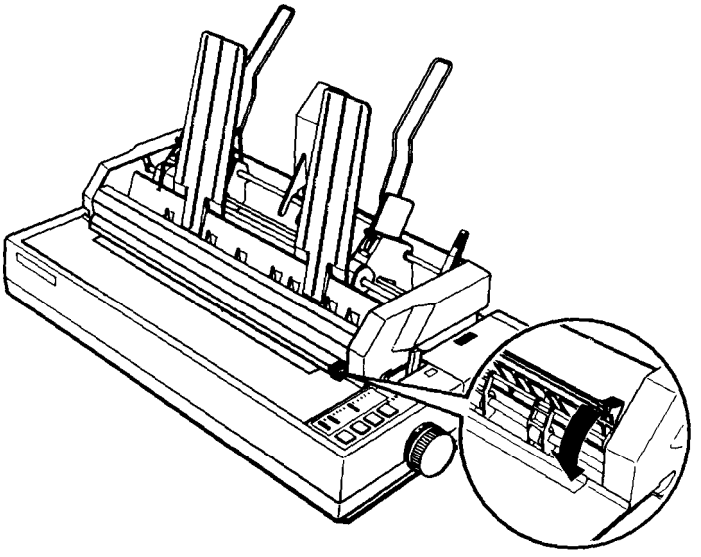
6. Separate the paper guide cover (transparent gray plastic) from the printer cover. With the underside of the paper guide cover toward you, notice the two plastic tabs that secure the paper guide cover to the printer cover. Press back on the inside edge of each of these tabs to release the paper guide cover.



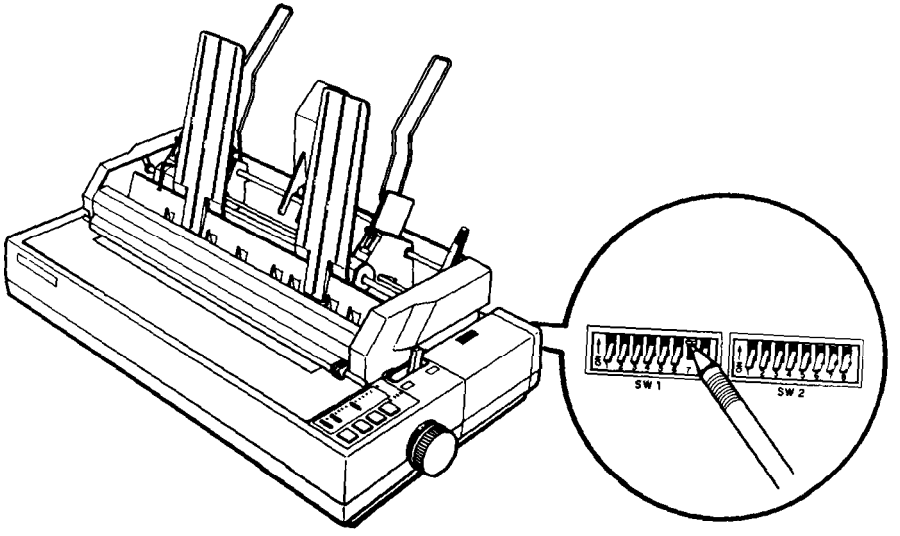
7. Raise the cut sheet feeder's paper path guide and attach the printer cover.



8. Close the paper path guide.



9. Turn on the cut sheet feeder mode by setting **DIP switch 1-7** to on.

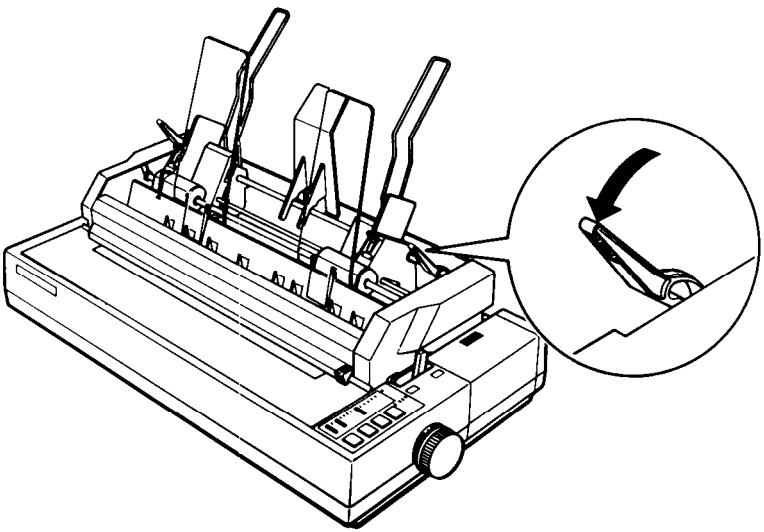


Note: Always make sure that the printer is turned off before changing the DIP switch settings.

10. Turn on the printer.

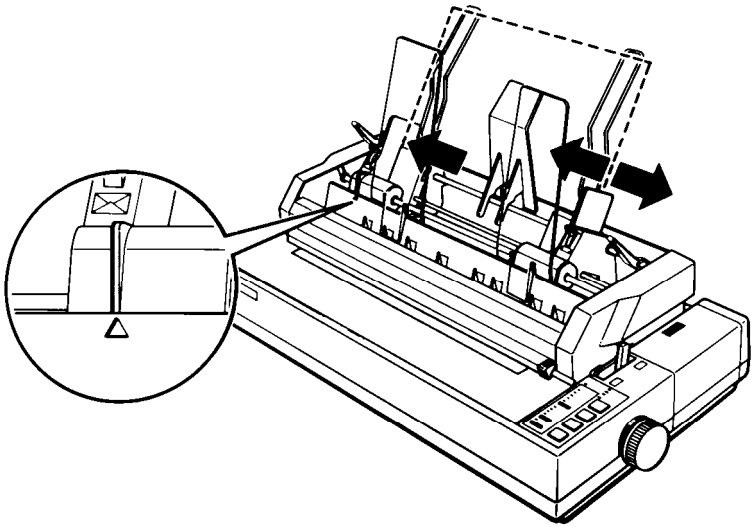
Paper Handling

1. Make sure that the cut sheet feeder mode is turned on with DIP switch 1-7.
2. Pull the left and right paper set levers of the selected bin all the way forward until the paper guides retract and lock open to allow for paper loading.

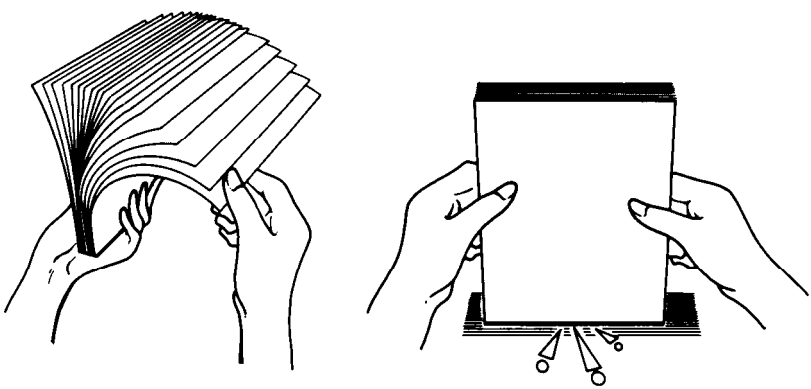


Note: Make sure the front levers on the left and right paper guides are up when using normal paper.

3. Slide the left paper guide to where the fin on the edge guide matches the arrow on the panel. Next, slide the right paper guide so that it roughly matches the width of your paper.

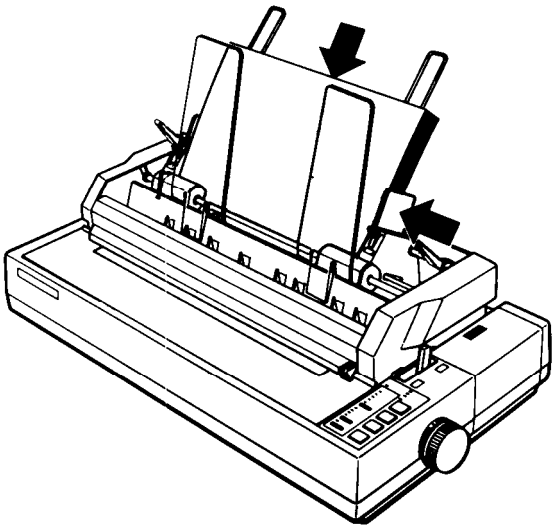


4. Take a stack of paper and fan it as shown. This keeps the paper from sticking and ensures that only one sheet feeds at a time. Tap the side and bottom of the paper on a flat surface to even the stack.

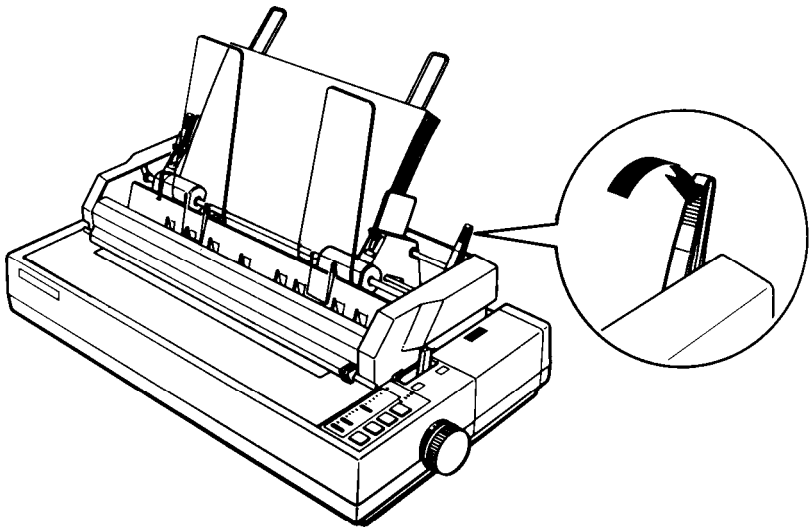


Note: For best results, use typewriter quality paper. If you plan to use paper with a glossy or textured surface, test it before using it to print documents. Do not use multi-part forms, carbon paper, or labels in the cut sheet feeder.

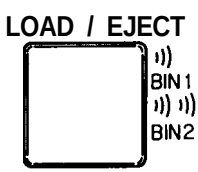
5. Insert the stack of paper between the paper guides, aligning it with the left edge of the guide. Then adjust the right paper guide until the paper is held firmly, but not so tightly that it causes the paper to buckle. Make sure the paper can move up and down freely.



6. Push the paper set levers back until they clamp the paper against the guide rollers. The levers will not close completely if too much paper is used. If this happens, remove some paper from the stack and try again.



7. If you use the double-bin cut sheet feeder, you can select the paper bin number with the control panel on the printer. When the printer is on line, press the LOAD/EJECT button to change between bin 1 and bin 2. The printer beeps once if you select bin 1 and twice for bin 2. (You can also select the bin with the ESC EM software command.>

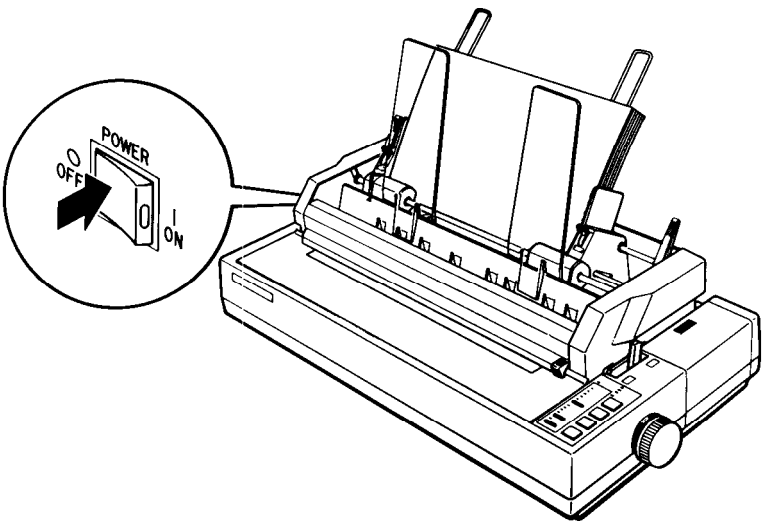


Testing the Printer in the Cut Sheet Feeder Mode

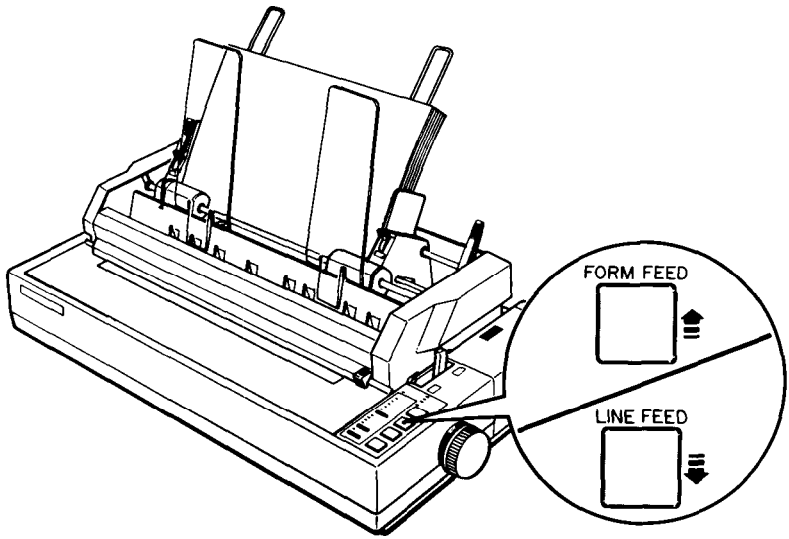
When you perform the cut sheet feeder self test, the printer counts the number of lines on the page. As shown on the following page, the number of lines counted is printed out at the bottom of the first test page. This number is the default page-length setting. This setting, however, can be overridden by software commands.

Running the self test is the same as when the cut sheet feeder mode is off. The steps below are for a self test in draft mode.

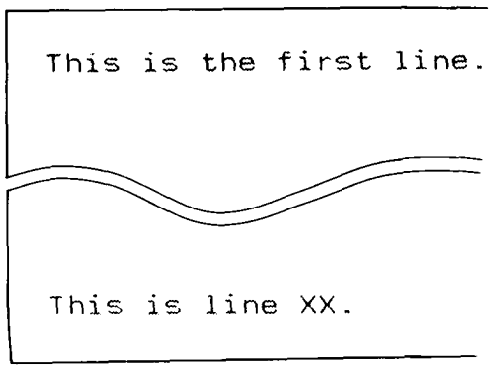
1. Make sure that the printer is turned off and a stack of paper is inserted in the selected bin of the cut sheet feeder. Check that the cut sheet feeder mode is selected and the paper release lever is pushed to the rear.



2. While holding down the LINE FEED button, turn on the printer. (For Letter Quality mode, press the FORM FEED button instead of the LINE FEED button.)



A part of the printout of the first sheet is shown below. The printout of the second sheet is similar to the original self test described in Chapter 1.



3. The self test continues until the paper runs out or until you press the ON LINE button. To stop the test, press the ON LINE button.

   Note: To resume the test, press the ON LINE button once more.

4. To end the self test when paper is loaded, press the LOAD/EJECT button to eject the paper. Then turn off the printer.

Loading Envelopes

You can print on plain, bond, or air mail envelopes. The cut sheet feeder can hold up to 25 plain or bond envelopes, or 30 air mail envelopes. Before printing on envelopes, you need to set the paper thickness lever. See Printing on Special Paper in Chapter 2.

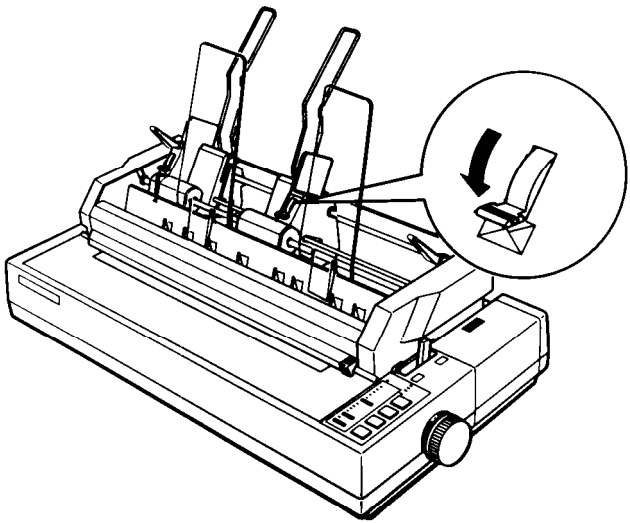
WARNING: When you print on envelopes, be sure that the settings of your application program keep the printing entirely within the printable area.

You load envelopes in much the same way as regular paper.

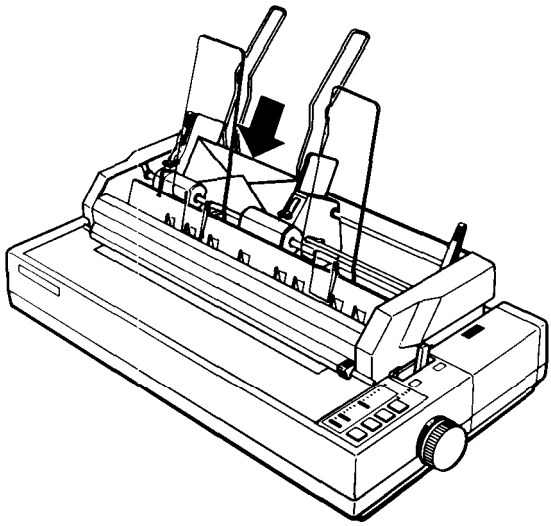
1. Make sure that the paper release lever is in the single-sheet position.

CAUTION: If you are using the double-bin cut sheet feeder, **be** sure to load envelopes into bin 1, never into bin 2. Make sure that you select bin 1 using the LOAD/EJECT button or with the ESC EM software command.

2. Push down on the two front levers on the left and right paper guides until they lock into position.



3. Take a stack of envelopes and fan it; then tap the stack on a flat surface to even the edges. Insert the envelopes into the front bin.



4. Press the LOAD/EJECT button to load an envelope. Then press the ON LINE button to start printing.

Operating the Cut Sheet Feeder

After stacking paper in the cut sheet feeder, turn on the printer and make sure that the ON LINE light is on. When the printer is on line, a new sheet of paper loads automatically whenever a printable character or line feed command is sent to the printer.

Paper out condition

When the printer is on line and receives print data from the computer, the first sheet loads automatically. Subsequent sheets load automatically as necessary.

- In the cut sheet feeder mode, the PAPER OUT light goes off while a sheet of paper is being fed, but the printer remains on line.

- When the specified paper bin is empty, the printer automatically goes off line and the PAPER OUT light goes on. To resume printing, add more paper and press the ON LINE button.

Note: If you turn off your printer during the time the printer detects a paper out or paper jam condition, any data remaining in the printer's buffer is discarded.

Control panel operation

To operate the cut sheet feeder from the control panel when the printer is in the cut sheet feeder mode, first make sure that the printer is off line.

LINE FEED	When there is paper in the printer, press this button to feed the paper one line or hold it down to feed the paper continuously.
FORM FEED	When there is no paper in the printer, press this button to load the paper. (Note that paper loads automatically when you print.) When there is paper in the printer, press this button to eject the sheet without loading the next sheet.
LOAD/EJECT	When there is no paper in the printer, press this button to load the paper. (Note that paper loads automatically when you print.) When there is paper in the printer, press this button to eject the sheet.
BIN 1 BIN 2 (LOAD/EJECT)	When the printer is on line, press this button to select either bin 1 or bin 2 if you are using a double-bin cut sheet feeder.

Software operation

The following commands cause the printer to eject the sheet in the printer without loading the next sheet.

FF:	Form Feed
ESC EM R:	Ejects a sheet in the cut sheet feeder mode

Note: The ESC EM command is a software command used to control the operation of the cut sheet feeder. For more information about this command, see the Command Summary in Chapter 9.

If the paper reaches the bottom of the print area when any of the following line feed commands is used, the sheet in the printer is automatically ejected and the next sheet is loaded.

LF:	Line Feed; advances the paper one line
VT:	Vertical Tab; advances the paper to the next vertical tab position
ESC J:	Line feed; advances the paper n/180th of an inch

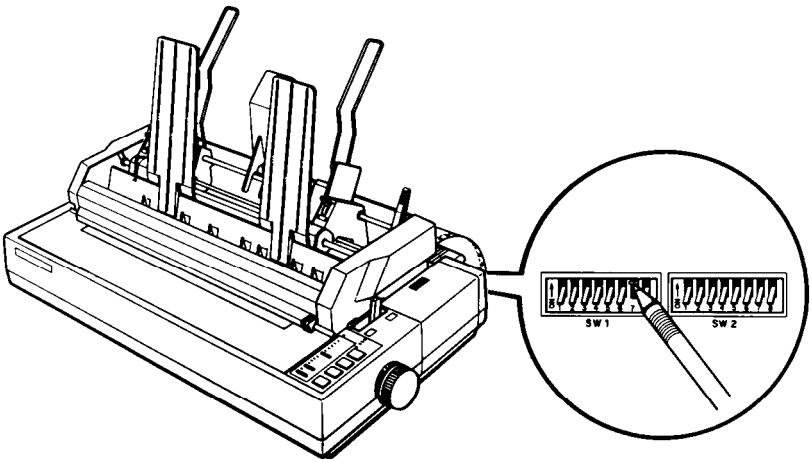
Software is not effective while the printer is off line. Make sure that the printer is on line if you wish to control the cut sheet feeder using software commands.

Using Continuous Paper

The printer allows you to easily switch between the cut sheet feeder and the tractor feeding system without having to remove either the feeder or the continuous paper supply.

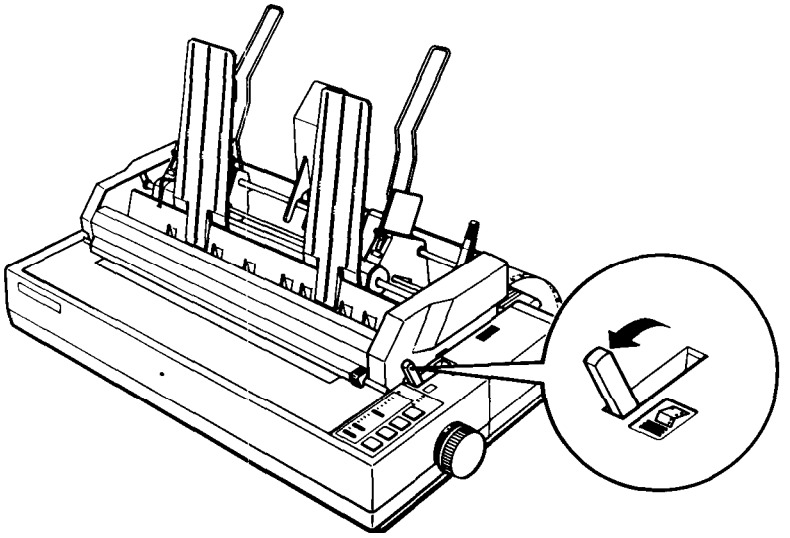
1. Make sure the continuous paper is already loaded and in a standby position as explained in Chapter 2.

2. Install the cut sheet feeder as described in this section, making sure that DIP switch 1-7 is set to on.

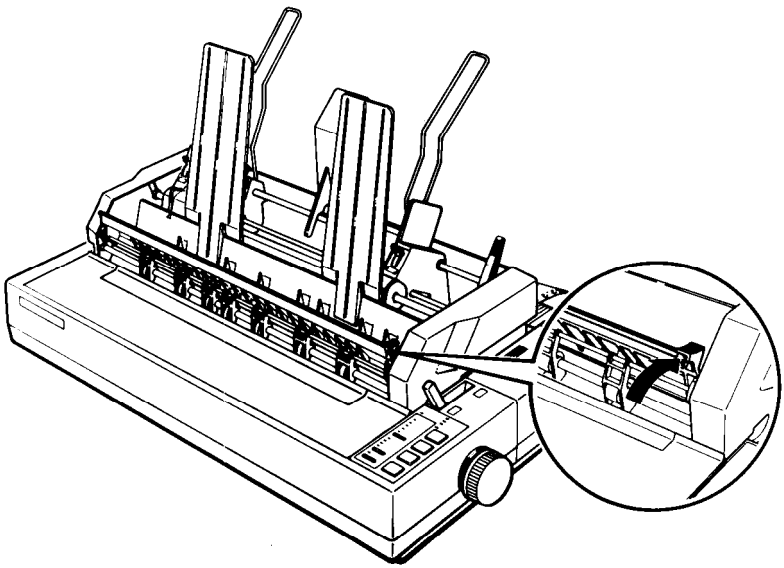


3. If a single sheet is still in the printer, eject it by pressing the LOAD/EJECT button.

4. To switch from the cut sheet feeder to continuous paper, pull the paper release lever forward to the continuous paper position. You do not need to change the setting of DIP switch 1-7.



5. Raise the paper path guide until it clicks open. This guide directs the flow of continuous paper out of the front of the printer.



6. Press the LOAD/EJECT button to load continuous paper.

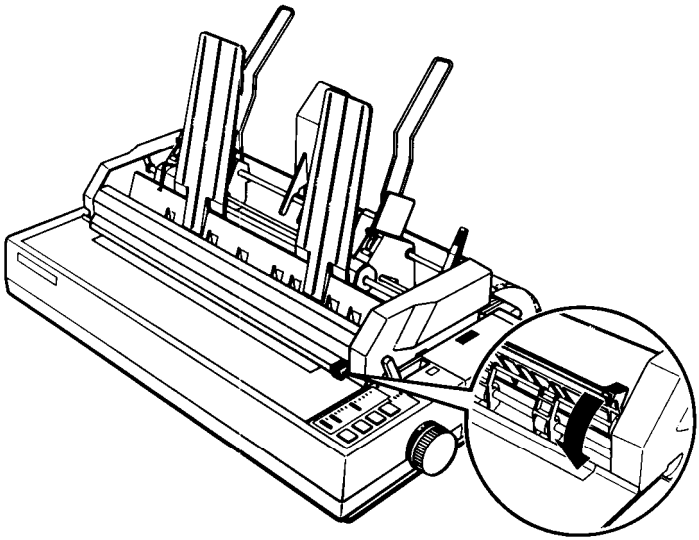
Note: With the paper release lever forward and the printer off line, the control panel functions normally, allowing you to use the micro-adjustment feature to finely adjust the loading position of your paper.

CAUTION: Never attempt to print on labels when the cut sheet feeder is installed.

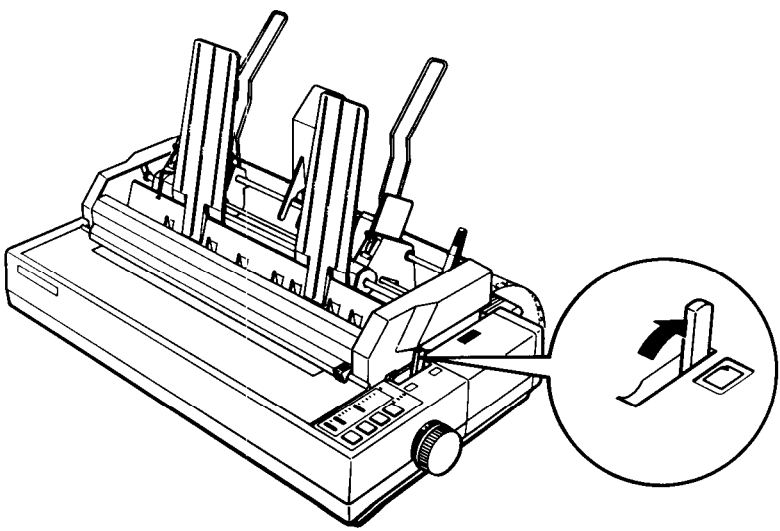
To switch back to using the cut sheet feeder, follow these steps:

1. Tear off all printed sheets. Press the LOAD/EJECT button until the continuous paper feeds backward out of the paper path.

2. Close the paper path guide and set the printer on line.



3. Push the paper release lever back to the single-sheet position.



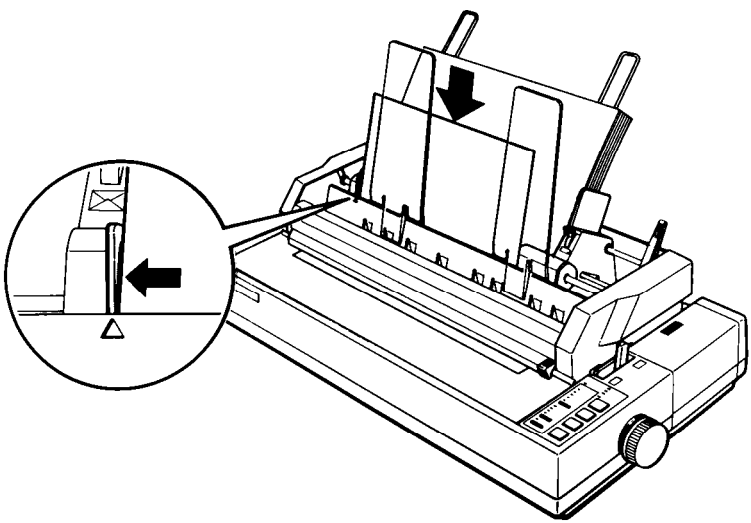
Loading Single Sheets

Your cut sheet feeder also has a single-sheet loading feature. This feature is especially useful because it allows you to switch to a different type or size of paper without replacing the stack of paper already in your cut sheet feeder.

1. Make sure that the paper release lever is in the single-sheet position.

CAUTION: If you are using the double-bin cut sheet feeder, make sure that bin 1 is selected by the LOAD/EJECT button or with the ESC EM software command.

2. Press the ON LINE button to take the printer off line.
3. Align the single sheet to be fed with the mark on the left paper guide. Then slide the sheet into the paper path until you feel resistance.

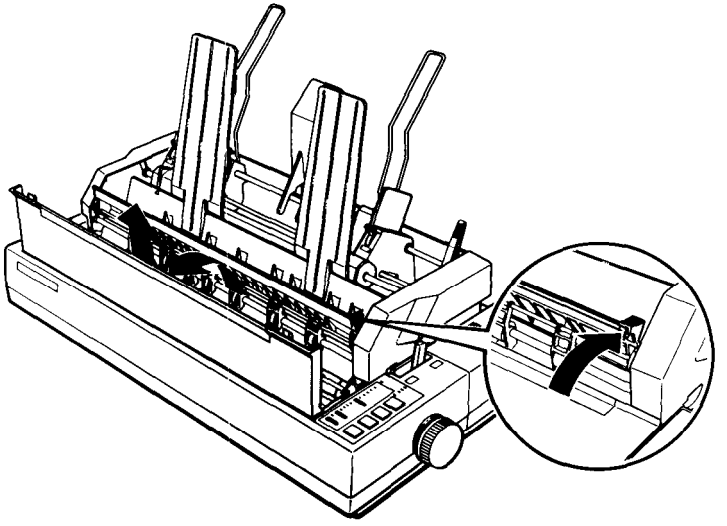


4. Press the LOAD/EJECT button to load the sheet.

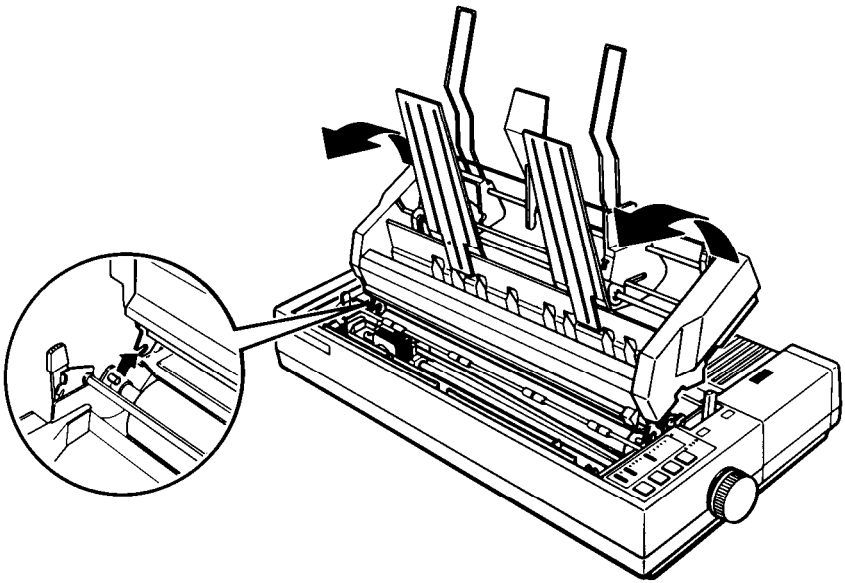
Note: If you want to load two or more consecutive single sheets, pull the paper set levers on the cut sheet feeder forward.

Removing the Cut Sheet Feeder

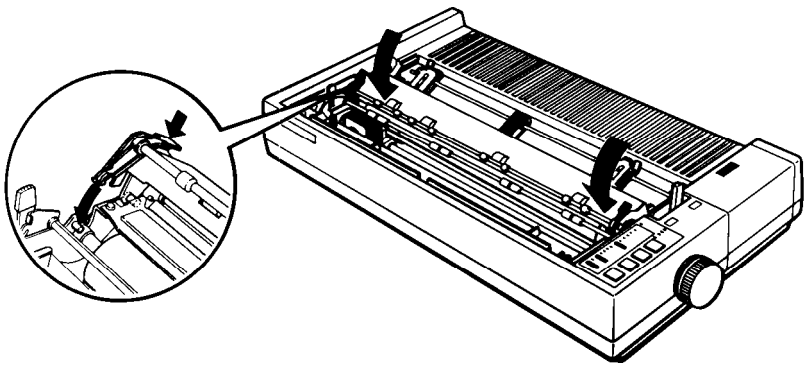
1. Turn off the printer and remove any paper stacked in the cut sheet feeder.
2. Open the cut sheet feeder's paper path guide and remove the printer cover.



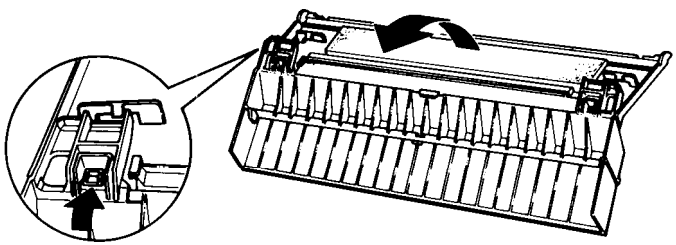
3. Tilt the back of the cut sheet feeder forward to release its notches from the printer's pins. Then lift up and remove the cut sheet feeder.



4. Replace the paper tension unit as shown below. Tilt the unit back and position the back notches on the unit over the rear mounting pins of the printer. Press the levers open as you tilt the unit toward you until the front latches click in place over the front mounting pins located behind the paper bail.



5. Attach the paper guide cover to the printer cover as shown below. Then install the printer cover unit onto the printer.



6. Set DIP switch 1-7 to off to turn off the cut sheet feeder mode.

Note: When DIP switch 1-7 is off, the printer uses the continuous paper page length selected by DIP switches 2-1 and 2-2.

Removal of the cut sheet feeder is now completed. Be sure to store the removed cut sheet feeder in its original box and packing materials.

The Pull Tractor

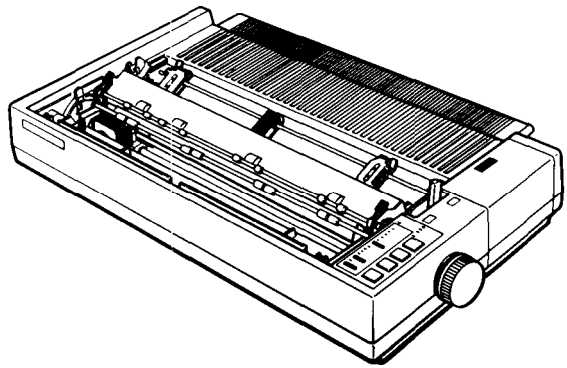
The optional pull tractor provides optimum continuous paper handling. The pull tractor is especially useful with continuous preprinted forms, multi-part forms, and labels. Use of the pull tractor is also recommended for obtaining the highest quality graphics. For best results, use the pull tractor along with the built-in push tractor as described in this section.

You can use the following pull tractors with the printers:

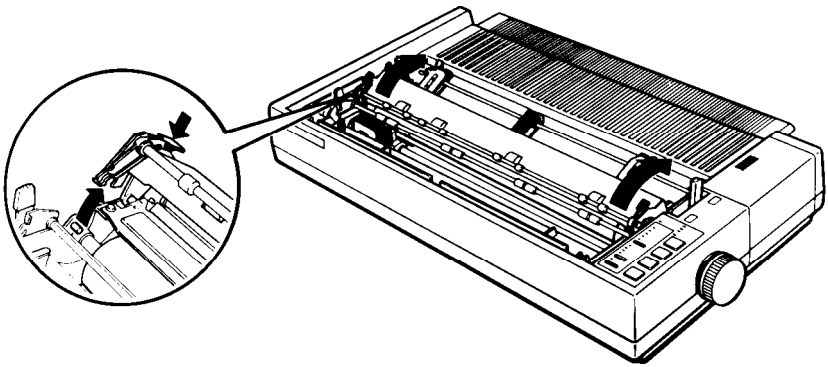
Printer	Pull tractor
LQ-850	#7311
LQ-1050	#7312

Installation

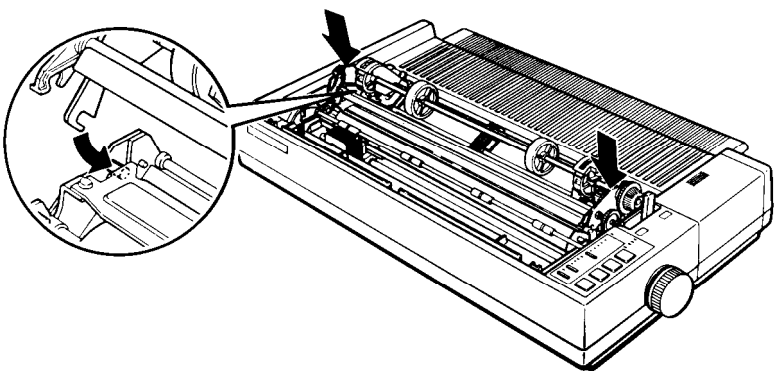
1. Turn off the printer and remove the printer cover unit and paper guide.
2. Install the paper rest.



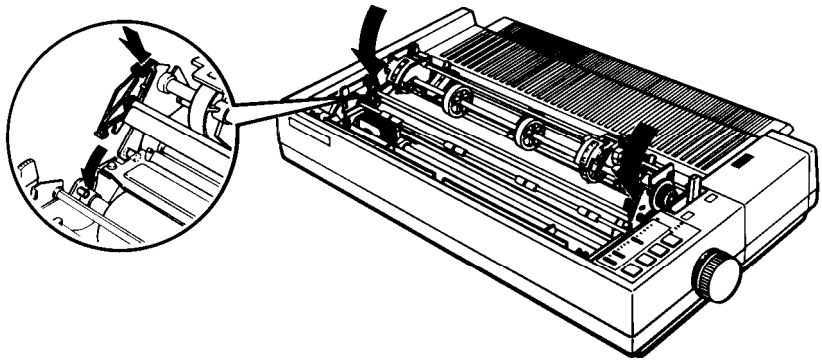
3. Remove the paper tension unit by pressing the levers back to open the mounting latches. At the same time, lift up the front of the unit.



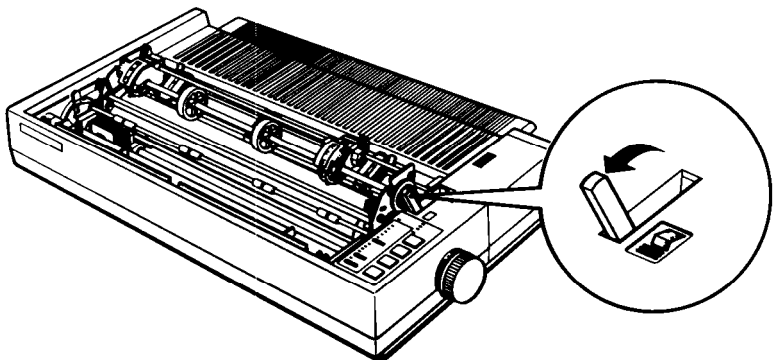
4. Hold the pull tractor with the knob to the right. Fit the rear notches on the tractor over the rear mounting pins of the printer, as shown in the following illustration.



5. Tilt the tractor unit toward you until the front latches click in place over the front mounting pins of the printer.



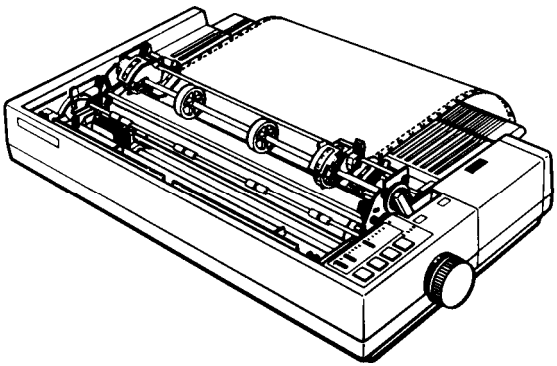
6. Pull the paper release lever all the way forward to the continuous paper position.



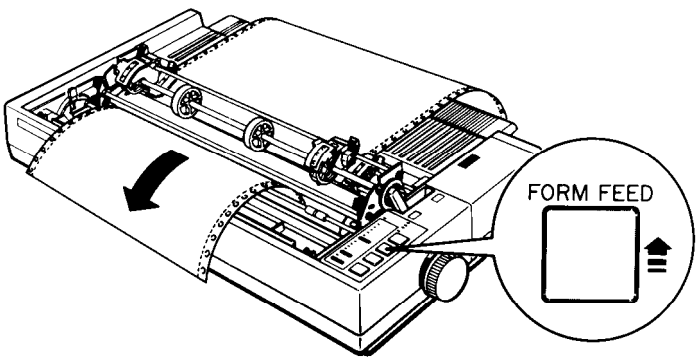
CAUTION: You cannot use the short tear-off function with the pull tractor. Before you start printing with the pull tractor, be sure that DIP switch 2-7 is set to off.

Paper Handling

1. With the printer cover unit removed, load continuous paper in the push tractor as described in Chapter 2. However, position the left sprocket unit about l/4 inch from the left before locking it in place. When you have paper loaded, turn on the printer.

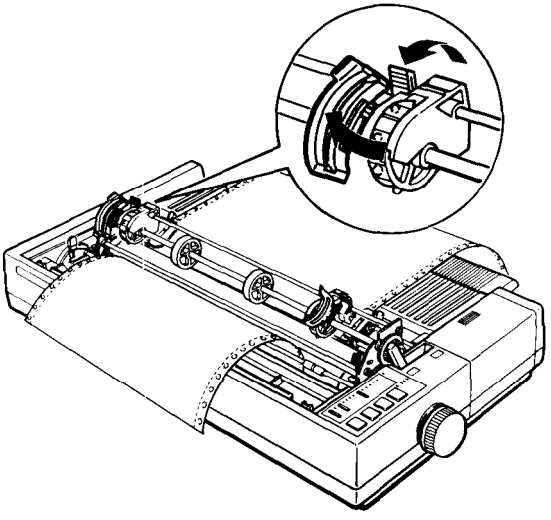


2. Make sure that the printer is off line and then press the LOAD/EJECT button to load the paper. Next, press the FORM FEED button to advance the paper one page so that you can fit the paper onto the pull tractor.

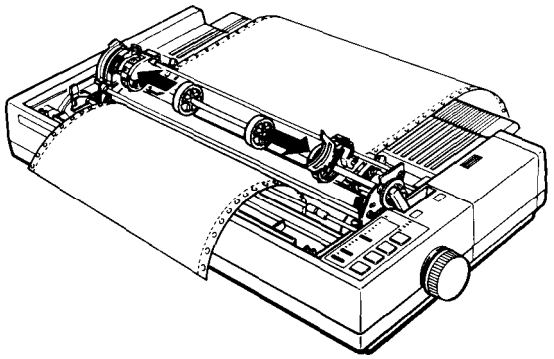


CAUTION: Never use the platen knob to feed the paper while the printer is turned on. If you need to adjust the loading position, use the micro-adjustment function described in Chapter 3.

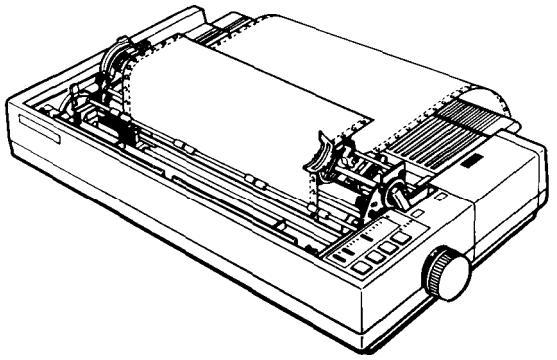
3. Open the sprocket covers of the pull tractor and pull the sprocket lock levers toward you to release them.



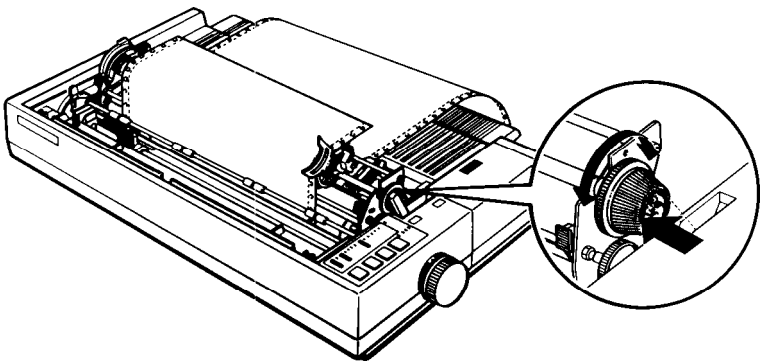
4. Adjust the sprocket units so that they are parallel with the push tractor sprockets. Place the paper supports evenly between the sprocket units. (There is only one paper support on the LQ-850.)



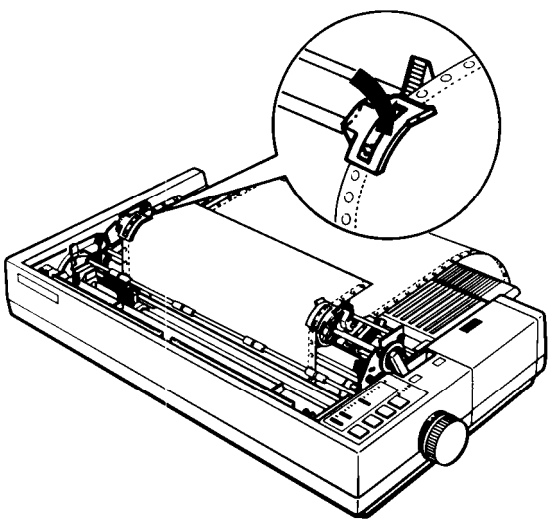
5. Fit the holes of the paper over the tractor pins on the sprocket units, adjusting the position of the sprocket units as necessary.



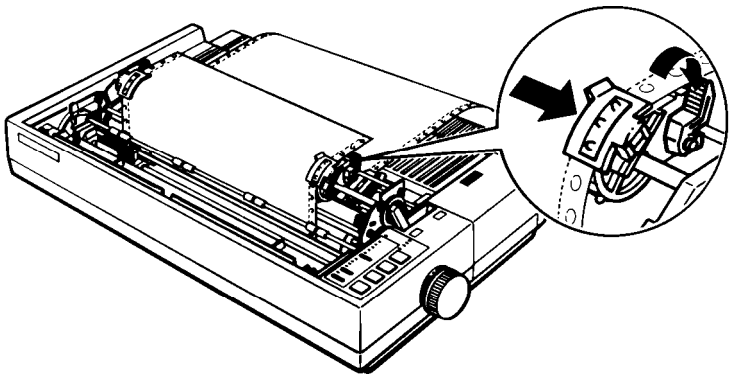
6. If the paper does not fit exactly onto the tractor pins or if the paper buckles, press in on the pull tractor knob and turn it in the desired direction until the paper fits properly.



7. Close the sprocket covers.

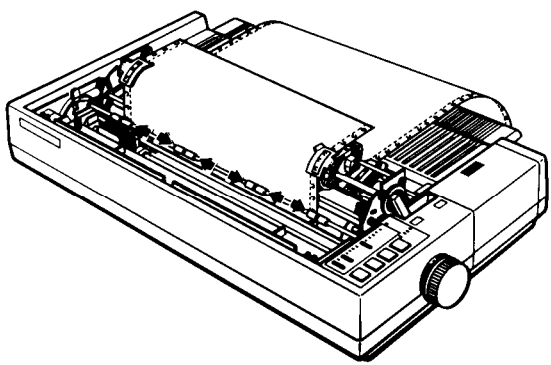


8. See that the paper is not crooked or wrinkled and lock the sprocket units in place.

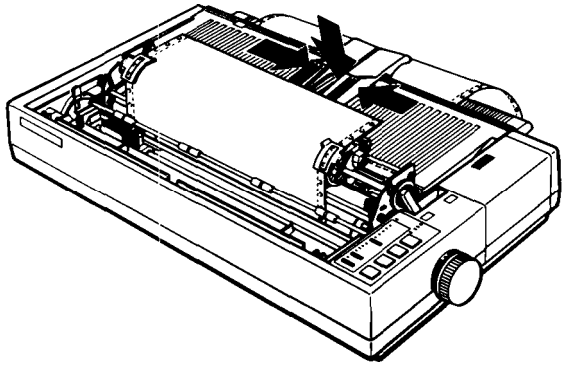


CAUTION: Make sure that the sprocket units of the two tractor units are properly aligned.

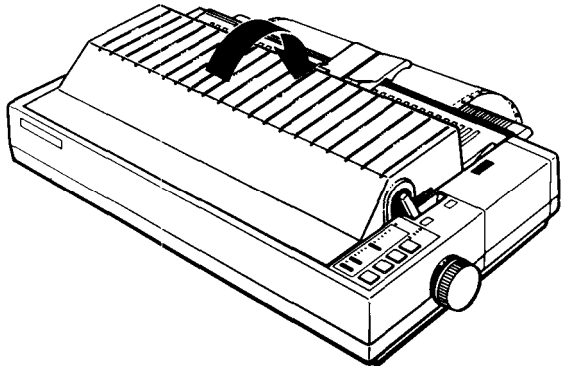
9. Slide the rollers on the paper bail bar so they are evenly distributed across the width of your paper, making sure that the right and left rollers are at both edges of your paper.



10. Attach the paper guide. Then slide the edge guides together so they meet at about the middle of the paper's width.



11. Install the pull tractor cover.

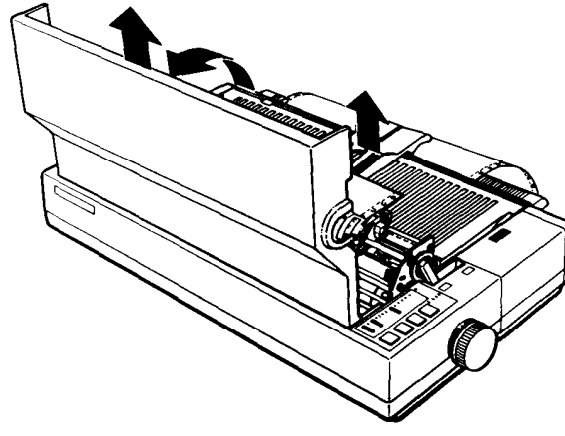


12. Press the ON LINE button to set the printer on line.

Note: Do not use the short tear-off feature with the pull tractor.

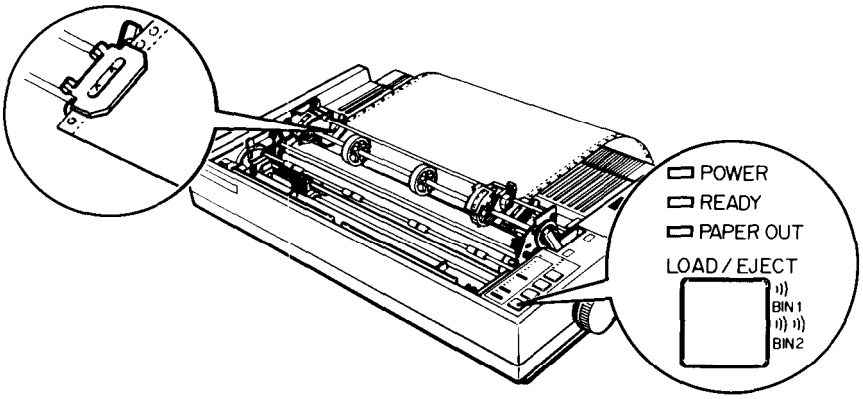
Removing the Pull Tractor

1. Remove the pull tractor cover and the paper guide.



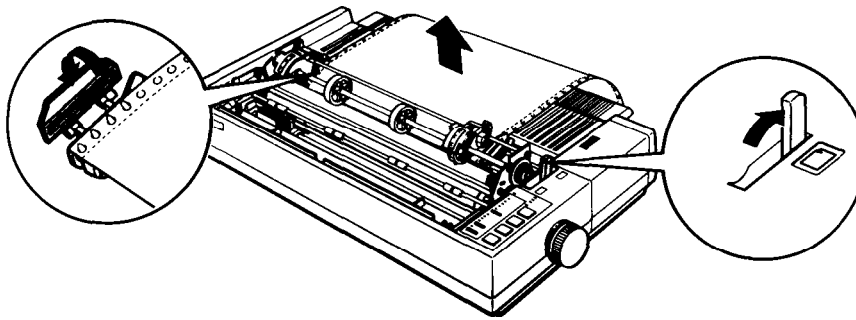
2. Tear off any printed sheets or extra blank sheets.

3. Press the ON LINE button to take the printe
LOAD/EJECT button until the continuous paper f
out of the paper path to the standby position. Th
light comes on when the paper is completely
path.

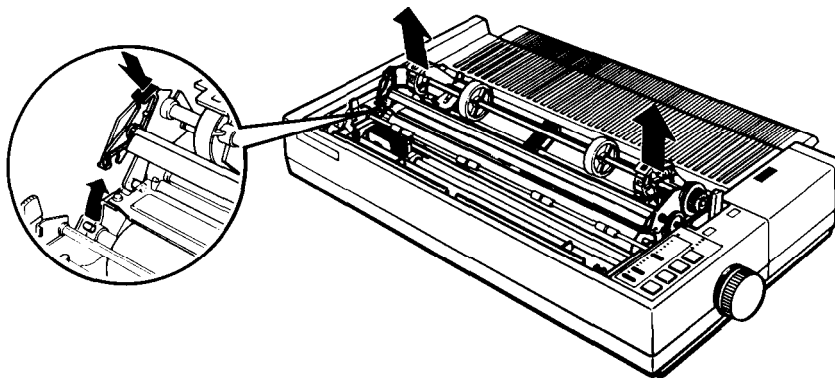


Note: Make sure you tear off the printed docu
removing paper with the LOAD/EJECT button. R
several pages at a time may result in a pap

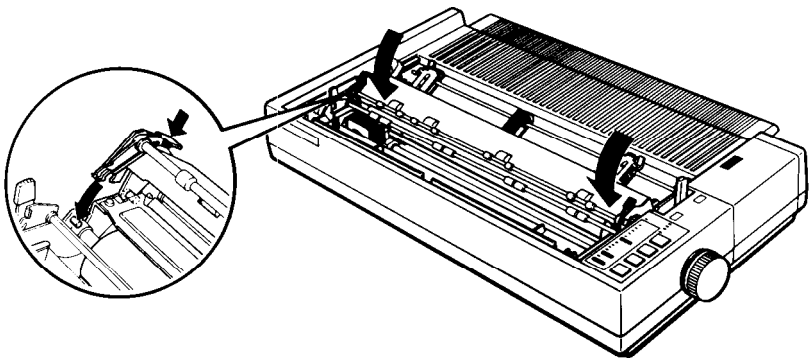
4. Remove the continuous paper from the push tractor unit. Then, push the paper release lever backward.



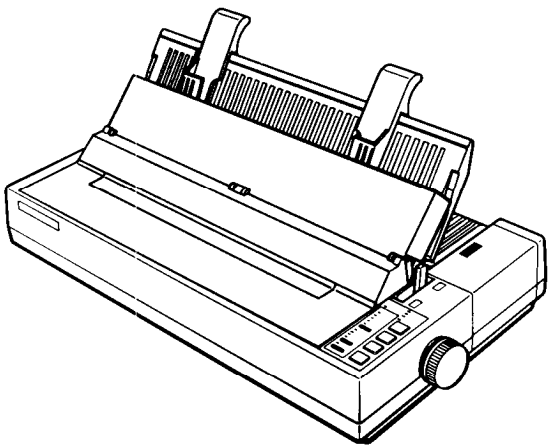
5. Turn off the printer. Then, pressing the tabs on the pull tractor, tilt it back and lift it off the printer.



6. Replace the paper tension unit as shown below. Tilt the unit back and position the back notches on the unit over the rear mounting pins of the printer. Press the levers open as you tilt the unit forward until the front latches click in place over the front mounting pins located behind the paper bail.



7. Install the paper guide and the printer cover unit.



The Interface Boards

A number of optional interfaces are available that supplement the capabilities of your printer's built-in serial and parallel interfaces.

Choosing an Interface

Optional interfaces can be divided into four main categories which are described briefly below.

- Serial interfaces are required if your computer is not equipped with a parallel interface or if you need an interface that conforms to the Current Loop standard instead of Rs-232C. These interfaces also provide some combination of the following features: X-ON/X-OFF data communication protocol, loopback self test modes, and data buffers that increase the printer's data buffering capacity by 8 KB.
- IEEE-488 interfaces offer standardized connections, trouble-free operation, and the ability to connect computers, printers, and other devices on the same line so that they may share data freely.
- Third-party interfaces, such as Coax and Twinax, allow Epson printers to function as local IBM printers without the addition of any other circuitry or components.
- The buffered parallel interfaces also offer trouble-free operation and standardized connections. They provide the printer with more memory to free the computer for other tasks when printing large amounts of text or graphics. You can increase the printer's data buffering capacity by an additional 32 KB (about 10 pages).

If you are unsure whether you need an optional interface or would like to know more about interfaces, contact your Epson dealer.

Compatible Interfaces

The following is a list of Epson interfaces that are compatible with your printer.

Interface number	Name
#8143	New serial interface
#8148	Intelligent serial interface
#8165	Intelligent IEEE-488 interface
C823032	32KB buffered parallel interface expandable to 512KB
C823021	32KB buffered serial interface expandable to 512KB

Note: Some interfaces may not be available in all countries.

All Epson interfaces have the Epson name printed on them. If the board has an identification code printed on it, it is a four-digit number beginning with 8 and should correspond to one of the numbers listed in the table above.

Coax and Twinax interfaces are also available from Epson dealers. These interfaces provide IBM emulation that allows you to connect your printer to a mainframe or minicomputer.

Installation

The optional interface boards available for your printer are easy to install. The only tool needed is a cross head screwdriver.

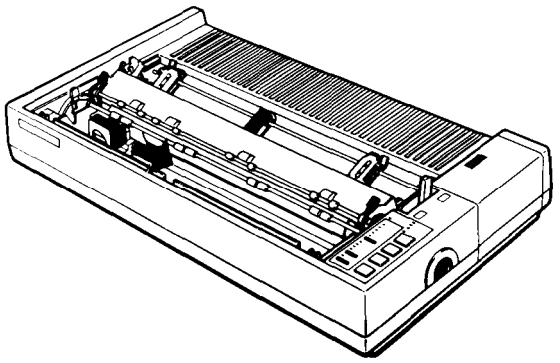
Note: Before you use the interface board, make sure your printer's DIP switches are set for parallel interface, even if you are installing a serial interface board.

Removing the upper case

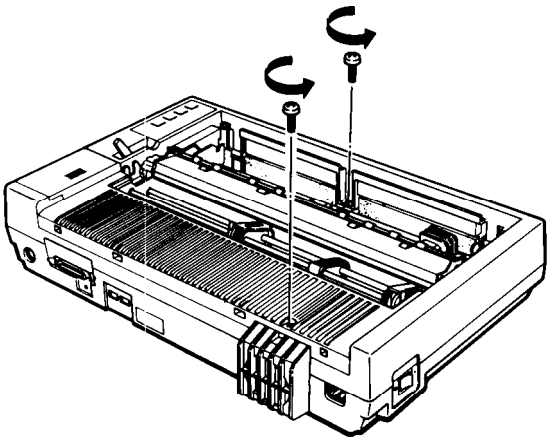
1. Turn off the power to the printer and the computer. Next, unplug the power cord from the electrical outlet and disconnect the interface cable from the printer.

WARNING: High voltages are present inside the printer when the power is on. Do not attempt to remove the cover unless the printer is turned off and the power cord is unplugged. Also, try not to touch contacts on the circuit board of the printer because many of the components can be destroyed by the static electricity that may build up on your body.

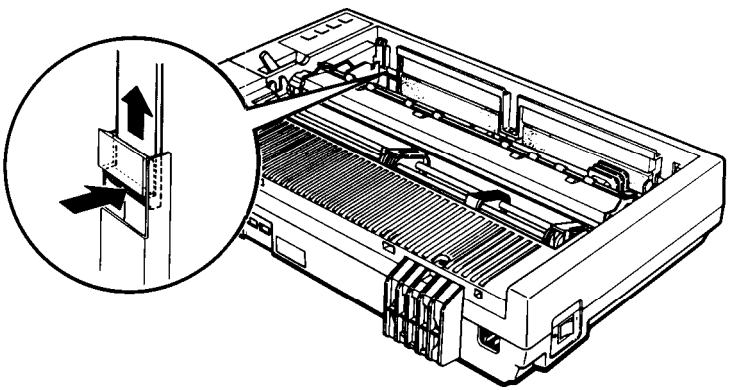
2. Remove any installed printer options such as the pull tractor or the cut sheet feeder. Then, remove the paper rest, the printer cover unit, the paper guide, the paper tension unit, and the platen knob. Remove the ribbon cartridge. Slide the print head to the center of the printer.



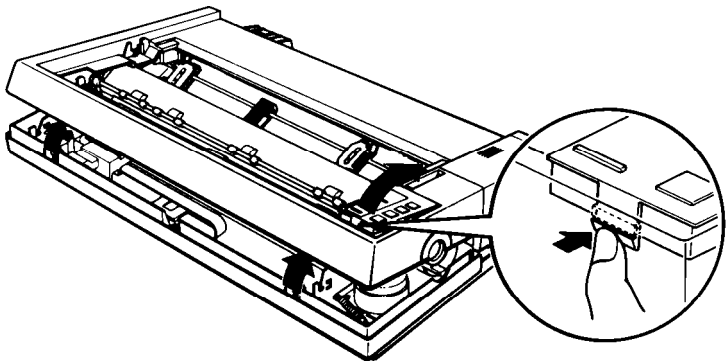
3. Using a cross-head screwdriver, remove the two retaining screws: one located at the front of the printer, the other at the back near the printer's fan.



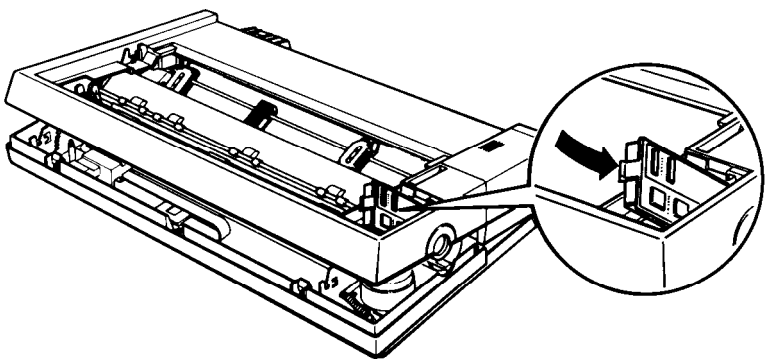
4. Detach the upper case by pressing in on the two retaining clips inside the front of the printer. The clips on the upper case release from the printer's lower case.



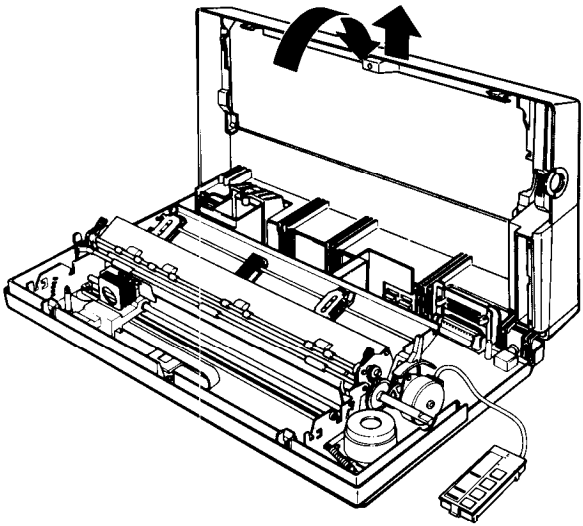
5. Partially raise the upper case. Look under the control panel and notice the clip that secures the control panel to the upper case. Now reach under the control panel and release the front clip.



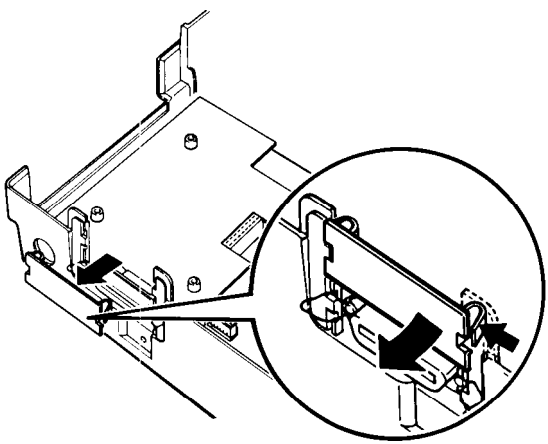
6. Slip the control panel back through the upper case.



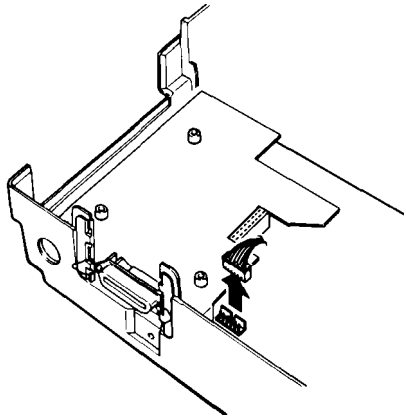
7. With the control panel free of the upper case, tilt the case straight back to detach the rear hinges, and then lift it off.



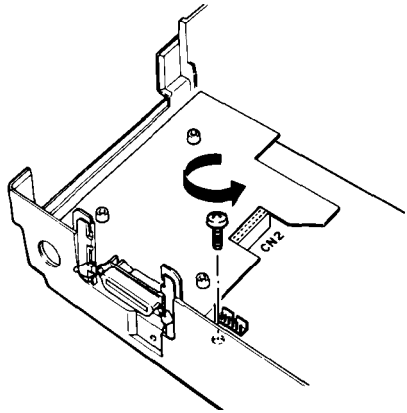
8. Remove the shield plate above the parallel interface by pressing in on the plastic clips located at the back of the plate. (The following illustration shows a rear view of the printer.)



9. Remove the power cable attached to the main board by grasping the clip at its base and pulling gently, but firmly, straight up. You may need to move the clip back and forth slightly as you pull upward to free it from the board.

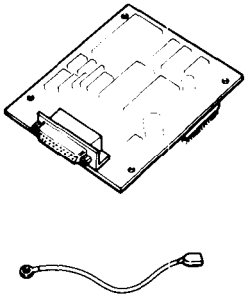


10. Remove the screw labeled CG (chassis ground) from the main board. The ground connector screw is located next to the power cable connector. Then set it aside in a safe place.

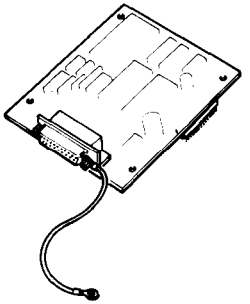


Installing the board

There are two basic types of interface board designs, which slightly change the way they are installed in the printer. The frame ground wire is attached for one type and not attached for the other. This difference does not affect the operation of the interface in any way. Check to see which type of interface board you have and then follow the instructions for that type of board.



FG wire not *attached*

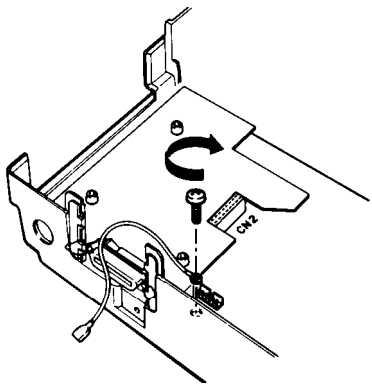


FG wire at attached

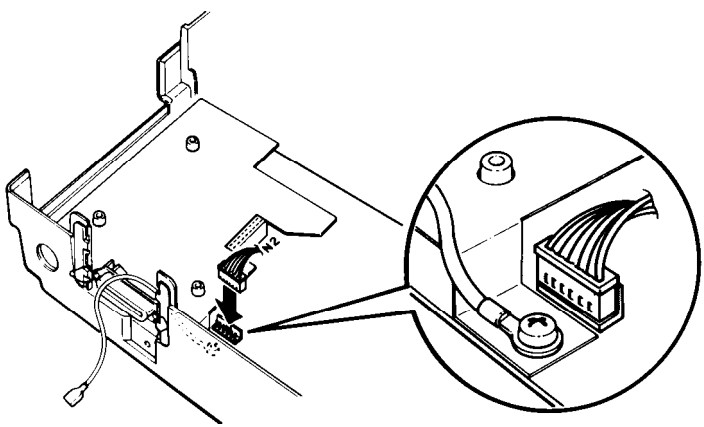
If the FG wire is not attached, follow these steps:

1. Set the DIP switches on the interface board according to the manual accompanying your interface board. (If you are installing the #8143 board, see the next section, #8143 New Serial Interface.)

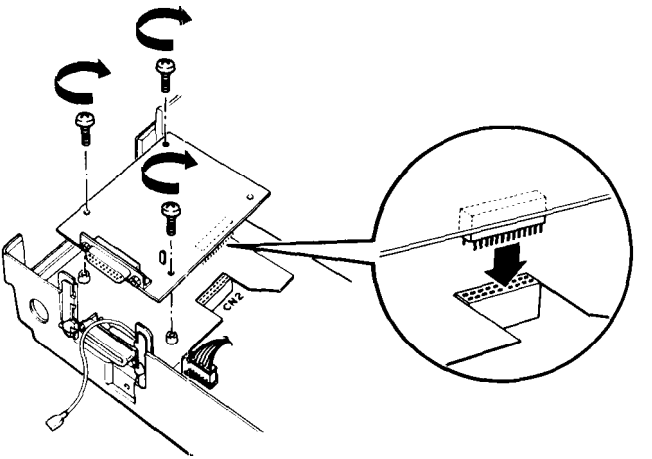
2. Use the CG screw to attach the round end of the FG wire to the main board and position the other end as shown.



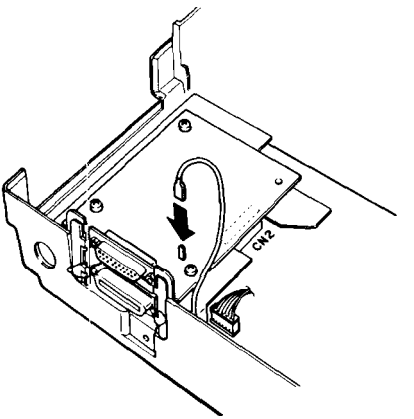
3. Reattach the power cable, making sure that the small fins on the white plastic clip are toward the inside of the printer. Take extra care to see that the holes of the clip are aligned with the pins of the connector.



4. Fit the interface board under the built-in tractor aligning the board with the CN2 connector on the main board and with the interface port of the back of the printer. Carefully insert the pins on the optional interface board into the mating connector on the main board. Then secure the board with three of the screws provided.

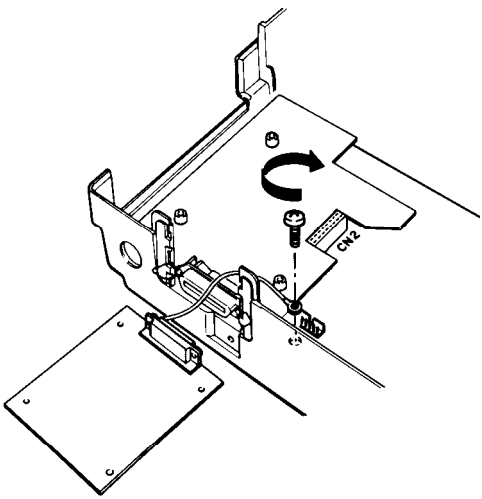


5. Attach the plug end of the FG wire onto the FG pin located on top of the interface board.

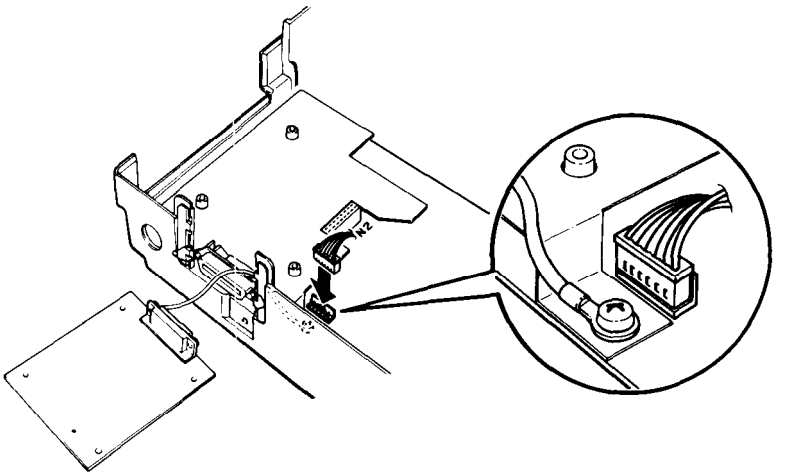


If the FG wire is attached, follow these steps:

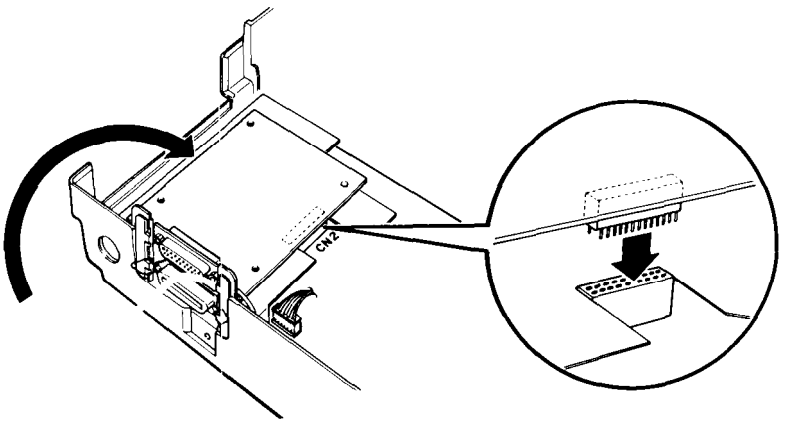
1. Set the DIP switches on the interface board according to the manual accompanying your interface board. (If you are installing the #8l43 board, see the next section, #8143 New Serial Interface.)
2. Carefully place the interface next to the printer as shown below. Use the CG screw to connect the round end of the FG wire to the main board.



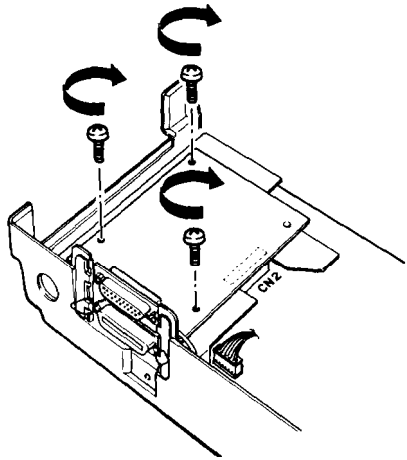
3. Reattach the power cable, making sure that the small fins on the white plastic clip are toward the inside of the printer. Take extra care to see that the holes of the clip are aligned with the pins of the connector.



4. Holding the interface board level, rotate it clockwise into position and attach it to the main board. Make sure the connector pins are properly inserted into the mating connector.

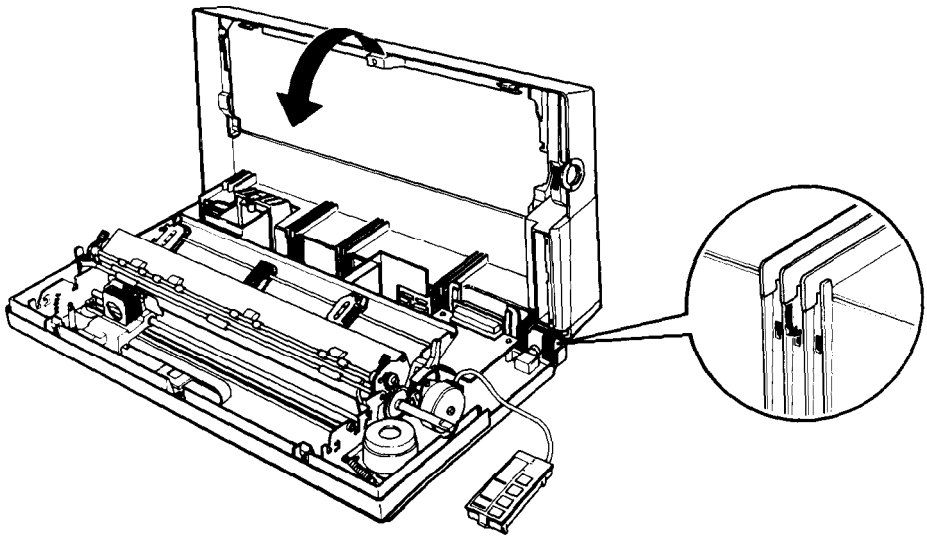


5. Secure the board with three of the screws provided.



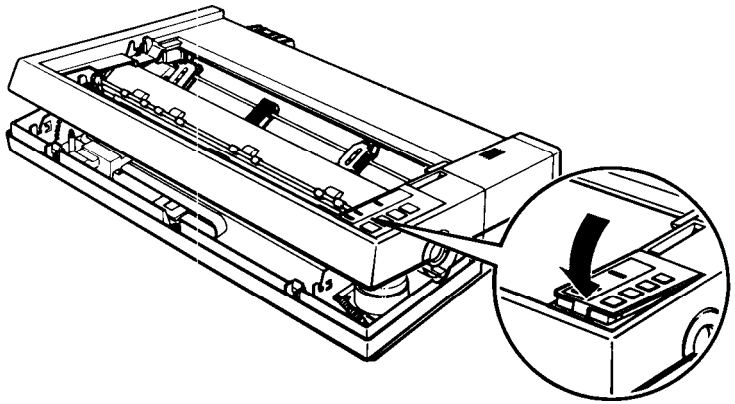
Attaching the upper case

1. Fit the rear hinges of the upper case into the openings in the lower case; then partially lower the upper case.

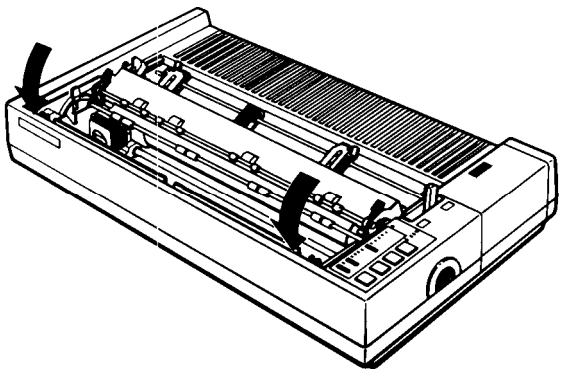


CAUTION: Take care not to pinch the FG wire between the upper and lower sections of the case.

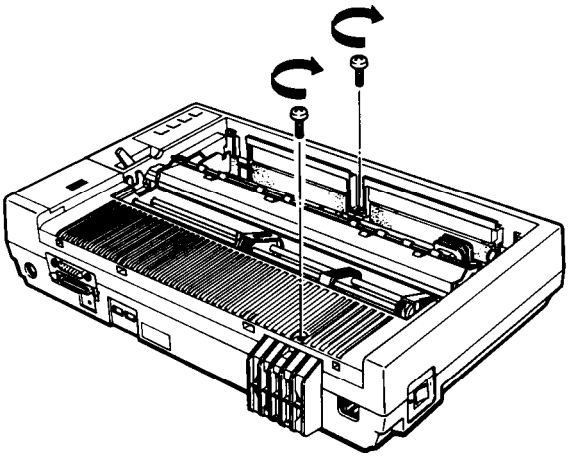
2. Slide the control panel out through the upper case. Make sure the control panel cable is clear of the upper case. Then reinsert the control panel into the upper case. Press down on the front of the control panel until the front clip snaps into place.



3. Close the upper case. Make sure you press down on the front of the case until it locks into place.



4. Secure the upper case with the two retaining screws.



5. Replace all parts and options you removed earlier.

CAUTION: Before you use the optional interface board, be sure to disconnect the interface cable for the printer's built-in parallel or serial interface. Two interface cables must not be installed at the same time.

#8143 New Serial Interface

If you are using an optional interface, it may be necessary for you to alter the communication protocol of the printer or the computer so that they can communicate properly. In most cases, you should use the information in your optional interface manual or your computer's manual to match the computer with the interface.

If you are using the #8143 optional interface board, make sure that you read through the section below on baud rate selection. You may also want to see the sections on handshaking timing and error handling for interface information specific to the printer.

For all other data transfer conventions, such as word structure or communications protocol, use the information in the manual supplied with your #8143 optional interface.

Baud rate selection

You can select baud rates from 75 to 19,200 BPS (Bits Per Second). When setting the baud rate, make sure that your printer's input buffer is enabled by setting the LOAD/EJECT button (the beeper sounds twice if the input buffer is enabled), and that you use the bit rate selection table for printers with buffers (in the #8143 interface manual).

For more information on the printer's input buffer settings, see Setting the DIP Swtiches in Chapter 3 of this manual.

Handshaking timing

When the vacant area for data in the input buffer drops to 256 bytes, the printer outputs an X-OFF code or sets the DTR flag to 1 (MARK) indicating that it cannot receive data.

Once the vacant area for data in the buffer recovers to 528 bytes, the printer outputs an X-ON code or sets the DTR flag to 0 (SPACE) indicating that it is again ready to receive data.

Error handling

When a parity error is detected, your printer prints an asterisk (*). All other errors, including framing and overrun, are ignored.

Chapter 6
Maintenance

Cleaning the Printer 6-2

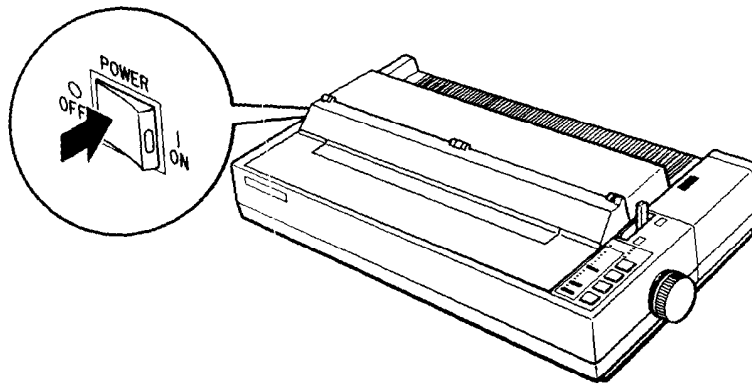
Replacing the Ribbon 6-4

Transporting the Printer. 6-9

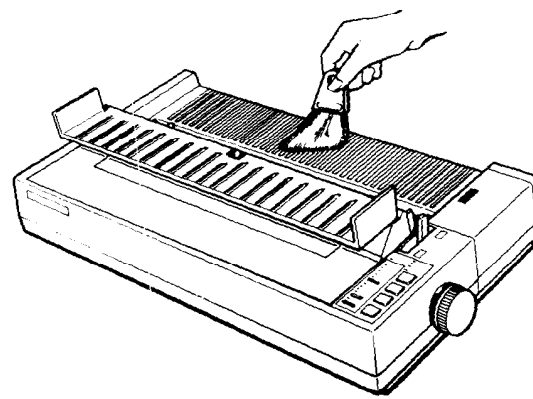
Cleaning the Printer

To keep your printer operating at its best you should clean it thoroughly several times a year. Follow the steps below:

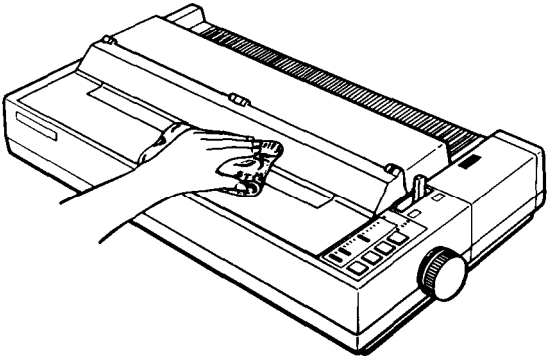
1. Make sure that the printer is turned off. Then remove the paper guide and any installed option



2. Using a soft brush, carefully remove all dust and dirt.



3. If the outer case or paper guide is dirty or dusty, clean it with a soft, clean cloth dampened with a mild detergent solution. Keep the printer cover in place to prevent water from getting inside the printer.



WARNINGS:

- Never use alcohols or thinners to clean the printer, because these chemicals can damage the components as well as the case.
- Be careful not to get water on the printer mechanism or electronic components.
- Do not use a hard or abrasive brush.
- Do not spray the inside of the printer with lubricants; unsuitable oils can damage the mechanism. Contact your Epson dealer if you think lubrication is needed.

Replacing the Ribbon

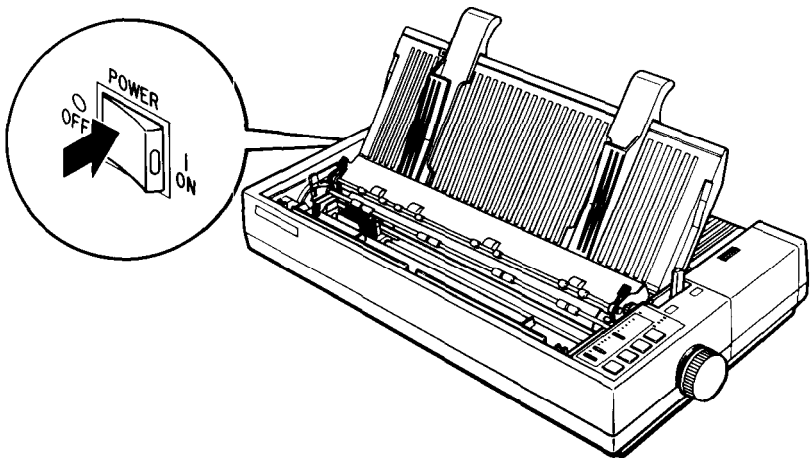
Replace the ribbon when the printout becomes too faint. The following Epson replacement ribbon cartridges are available:

Printer	Standard ribbon	Film ribbon
LQ-850	#7753	#7768
LQ-1050	#7754	#7770

Notes:

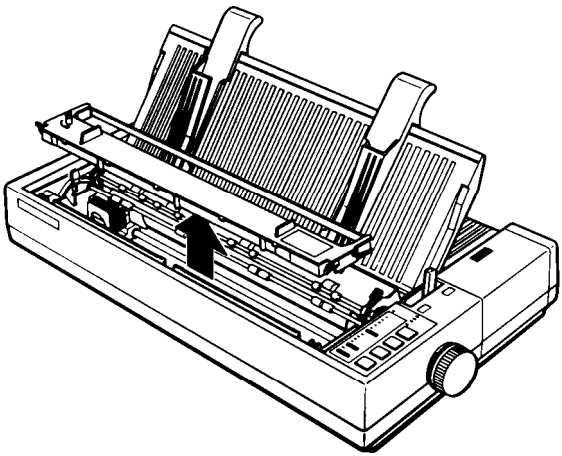
- Use the optional film ribbon only when you need especially high quality printing. For everyday operations, use the standard ribbon.
- Do not use ribbons designed for nine-pin printers.

1. Make sure that the printer is turned off. Then remove the printer cover unit.

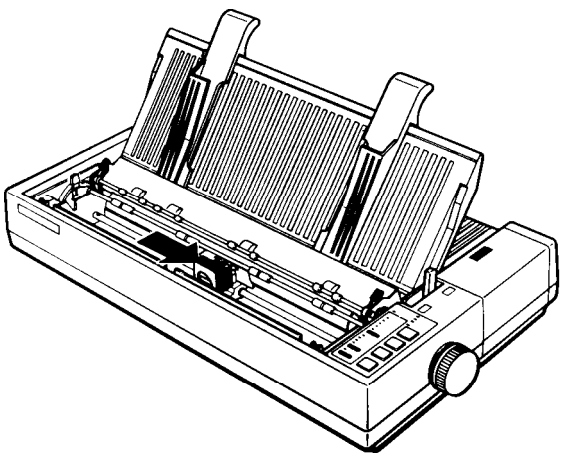


WARNING: If the print head is hot, let it cool before attempting to replace the ribbon.

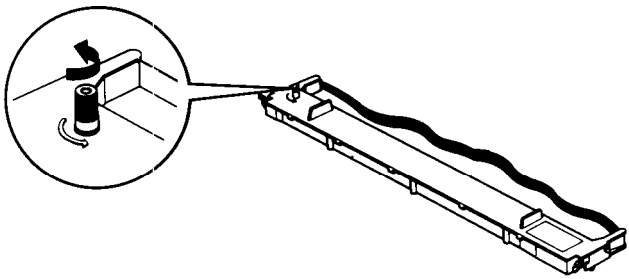
2. To remove the ribbon cartridge, grip it by the two black handles and lift the cartridge straight up and out of the printer. (Ribbon cartridges #7753 and #7768 have only one handle.)



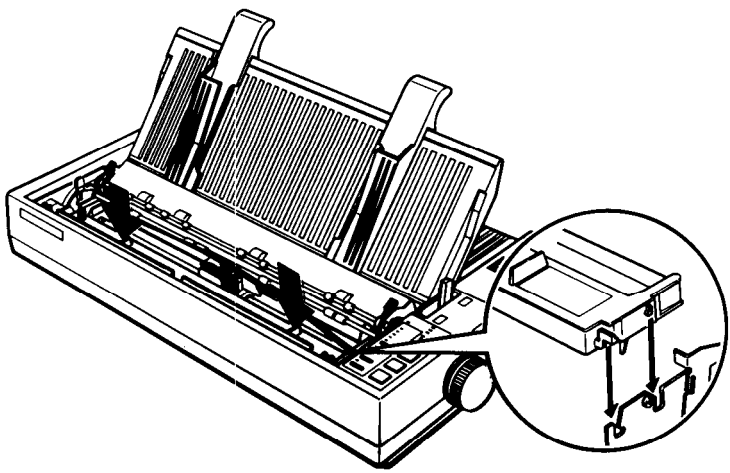
3. Slide the print head to the middle of the printer.



4. To remove slack in the new ribbon, turn the ribbon-tightening knob in the direction of the arrow.

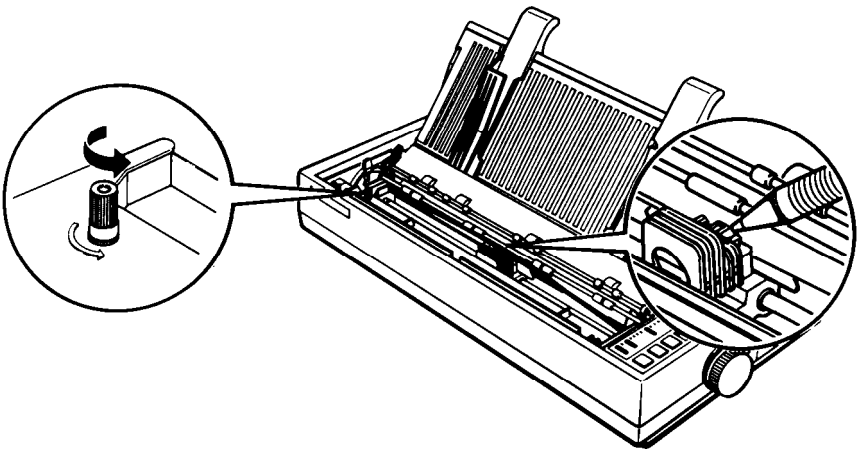


5. Push the new ribbon cartridge firmly into position, making sure the plastic hooks fit into the slots, as shown below.

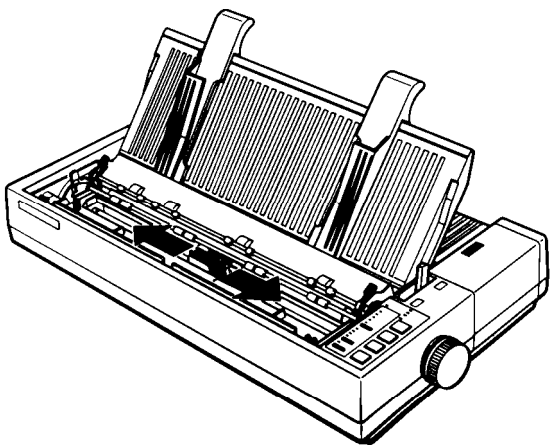


Note: Press lightly on both sides of the cartridge to make sure the hooks are properly inserted.

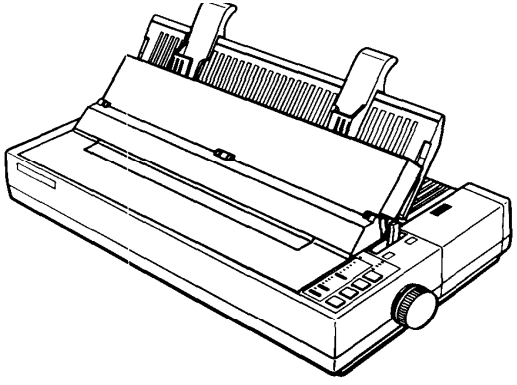
6. Use a pointed object, such as a ballpoint pen, to guide the ribbon between the print head and ribbon guide while you turn the ribbon-tightening knob to help feed the ribbon into place. Be careful not to puncture the ribbon.



7. Slide the print head from side to side to make sure it moves smoothly. Also see that the ribbon is not twisted or creased.



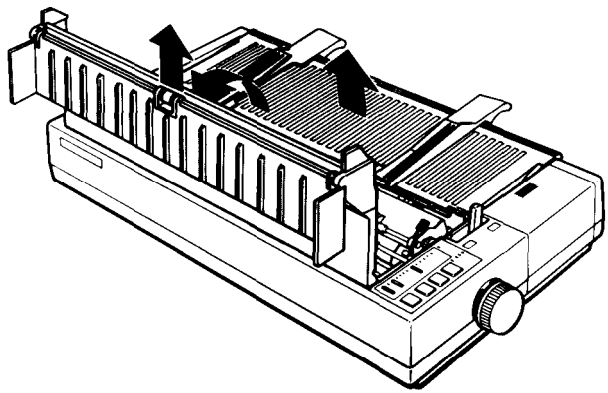
8. Reattach the printer cover unit.



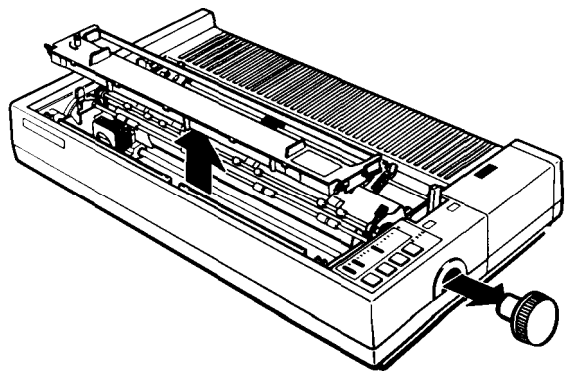
Transporting the Printer

Before you transport your printer some distance, carefully replace it in the original box and packing materials, as described below.

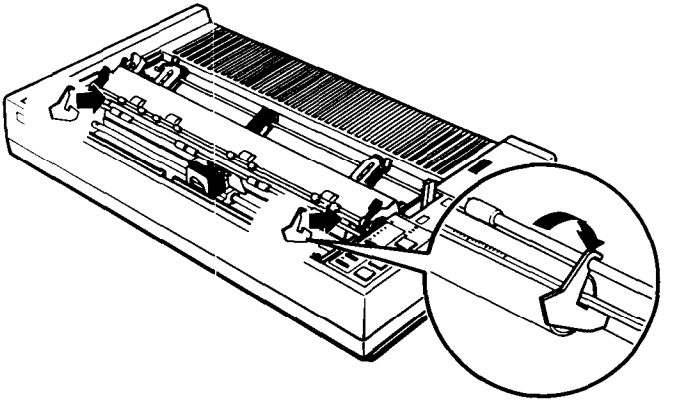
1. Turn off the printer, then remove any installed options.
2. Unplug the power cord from the electrical outlet and disconnect the interface cable between the printer and the computer.
3. Remove the printer cover unit and the paper guide.



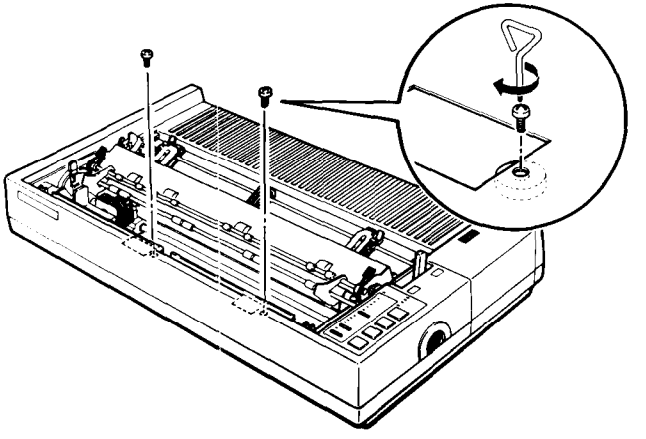
4. Remove the ribbon cartridge and the platen knob.



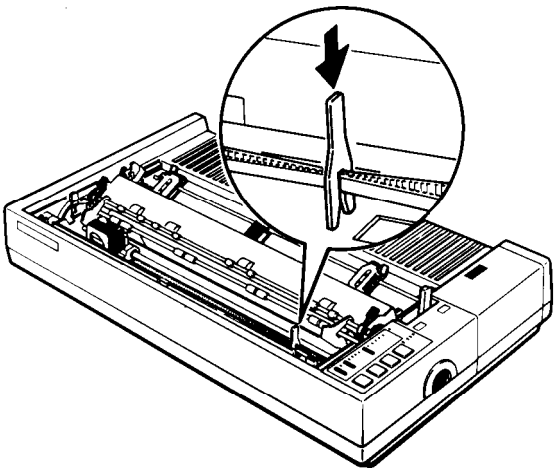
5. Slide the print head to the middle of the printer. While holding the paper bail bar open, reattach the left and right locking tabs.



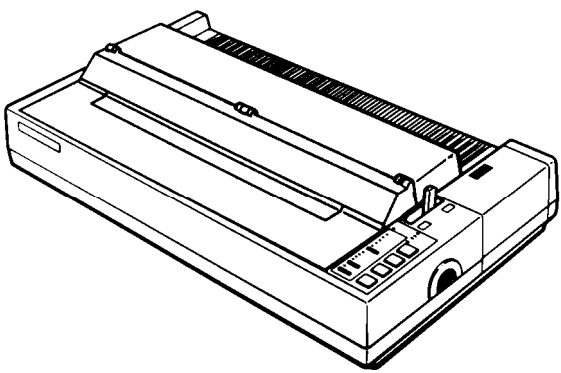
6. Slide the print head all the way to the left. Using the enclosed cross-head screwdriver, reattach the two red screws.



7. Insert the print head protector as shown below.



8. Reattach the printer cover unit.



WARNING: When you carry the printer, never hold it by the compartment cover on the right side. If this cover comes off, you may drop the printer.

9. Fit the printer back into the white packing material and then back into its original box.

Chapter 7
Troubleshooting

Problems and Solutions 7-2

Power Supply. 7-4

Printing 7-5

Paper Handling 7-16

Options.. 7-27

Problems and Solutions

This chapter discusses problems you may encounter while operating your printer and their likely solutions. If you are having difficulty achieving the desired printing result, first locate the problem in the table below and then see the appropriate page for the solution.

Power supply

- Power is not being supplied. See 7-4

Printing

- The printer does not print. See 7-5
- The print is faint or uneven. See 7-6
- Dots are missing in the printed characters or graphics. See 7-7
- Printed characters are not what you expected. See 7-8
- The print position is not what you expected. See 7-11

Paper handling

- Single sheets do not feed properly. See 7-16
- Continuous paper does not feed properly when using the push tractor. See 7-19
- Switching between single sheets and continuous paper cannot be performed properly. See 7-24
- The short tear-off function does not operate properly. See 7-26

Options

- Using the cut sheet feeder, the paper does not feed properly. See 7-27
- Using the pull tractor with the push tractor, continuous paper does not feed properly. See 7-31
- Using an optional interface, the printer does not operate properly. See 7-35

Power Supply

Problem	Solution
Power is not being supplied.	
The POWER light does not go on.	The power cable may not be properly plugged into the electrical outlet. Turn off the printer and properly plug the power cable into the electrical outlet. The power switch is off. Turn it on. Power is not being supplied to the electrical outlet. Plug another electrical device into the outlet to determine whether the outlet is operating properly. If the electrical outlet is controlled by a switch, use an electrical outlet that is not controlled by an outside switch.
The POWER light comes on then goes off. The light stays off even when the power is switched on again.	The voltage may not be correct for your printer. Check the label on the printer's back panel and confirm that the printer's voltage rating matches your electrical outlet. If the voltages do not match, unplug 'the printer and contact your Epson dealer immediately. Do not reconnect the power cord to an electrical outlet. The problem may lie with the electrical outlet. Plug another electrical device into the outlet to determine whether the outlet is operating properly.

Printing

Problem	Solution
The printer does not print.	
The ON LINE light is on but nothing is printed.	The software may not be installed properly for your printer. Check the printer settings and make the necessary changes. The interface cable may be loose. Check both ends of the cable between the printer and the computer. Secure the connector using the wire retaining clips. You may not be using the correct interface cable. Make sure your interface cable meets the printer and the computer specifications.
The ON LINE light is off.	The printer may be off line and cannot receive data. Press the ON LINE button. The ON LINE light should go on. See Chapter 3.
The PAPER OUT light is on.	The paper may be set too far to the right, so that the paper detector cannot sense it. Move the paper a little to the left. The PAPER OUT light should go off. The printer may be out of paper. Load more paper into the printer. See Chapter 2.

Problem	Solution
The printer does not print (continued).	
The printer sounds like it is printing, but nothing is printed.	The ribbon cartridge may not be installed properly. Turn off the printer, reinstall the ribbon cartridge, and take up any slack in the ribbon. The ribbon may be worn. Replace the ribbon cartridge. See Chapter 6.
The printer makes a strange noise, the buzzer sounds several times, and the printer stops abruptly.	This indicates an error in printer operation. Turn off the printer, check for paper jams or other problems, then turn the printer back on. If the printer still does not print correctly, contact your Epson dealer.
The ON LINE light is flickering but the printer does not print, or it stops printing abruptly.	The print head is overheated. Wait a few minutes; the printer resumes printing automatically when the print head cools.
The print is faint or uneven.	
Printed characters have parts missing at the bottom as shown here. ABCD	The ribbon cartridge may not be installed properly. Remove the ribbon cartridge and reinstall it. Make sure the cartridge hooks are inserted securely into the printer. See Chapter 6.

Problem	Solution
The print is faint or uneven (continued).	
The printout is faint.	The ribbon may be worn out. A worn ribbon can damage the print head and should be replaced. Install a new ribbon cartridge. See Chapter 6. The paper thickness lever may not be set correctly for the paper you are using. Set the paper thickness lever to match the thickness of your paper. See Chapter 2.
Dots are missing in the printed characters or graphics.	
A line of dots is missing in the printout. **ABCD**	The print head is damaged. Stop printing and contact your Epson dealer to have the printer repaired.
Dots *are missing in random positions.* ABCD	There is either too much slack in the ribbon or the ribbon has come loose and gotten caught on something. Stop printing, turn off the printer, and reinstall the ribbon cartridge. See Chapter 6.

Problem	Solution
Printed characters are not what you expected.	
The typestyle or *characters that are set by the software cannot be printed.*	The software may not be correctly installed for your printer. Use the program's setup (or install) procedure to check the printer settings, and reset as needed.
The wrong font *is printed.*	Check your software manual, Chapter 3, or Chapter 9 for information on using fonts.
italic characters are printed instead of *the selected graphic "line" characters.*	The wrong character table is selected. If your application program is capable of sending control codes, specify the Epson Extended Graphics character table using ESC t 1. See Chapter 9. You can also select the graphics character table by changing a DIP switch setting. To do this, turn off the power, set DIP switch 1-4 to on, then turn on the printer. See Chapter 3.

Problem	Solution
Printed characters are not what you expected (continued).	
Graphic characters or lines are *being printed instead* of *the selected italic characters.*	The wrong character table is selected. If your application program is capable of sending control codes, specify the italic character table using ESC t 0. You can also select the italic character table by changing a DIP switch setting. To do this, turn off the power, set DIP switch 1-4 to off; then turn on the power. See Chapter 3.
The wrong international characters are being printed.	The wrong international character set is selected. If your application program is capable of sending control codes, specify the desired international character set using ESC R *n*. See the description of ESC R in Chapter 9. You can also select the international character table by changing DIP switch settings. To do this, turn off the power and set DIP switches 1-1, 1-2, and 1-3 to the correct positions for the character set you want. See Chapter 3. You can check the current DIP switch settings by running the self test.

Problem	Solution
Printed characters are not what you expected (continued).	
The wrong graphics characters are printed.	The wrong graphics character set is selected. To set the desired graphics character set, turn off the power and set DIP switches 1-1, 1-2 and 1-3 to the correct positions for the graphics character set you want. See Chapter 3.
The characters printed are smaller than expected.	The condensed mode may be set. Check to see if the CONDENSED light on the control panel is on. If it is lit, press the CONDENSED button to cancel the mode. Also, if your application program is capable of sending control codes, you can cancel the condensed mode by sending the DC2 code to the printer. See Chapter 9.
The typestyle selected by SelecType is not printed.	The software may not be properly installed for your printer. Use the program's setup (or install) procedure to check the printer settings and reset as needed. Your software may be overriding your SelecType setting. If your program allows you to change the printing style, software control will override the SelecType settings. For these application programs use the program, not SelecType, to change typestyles.

Problem	Solution
Printed characters are not what you expected (continued).	
The printer prints a series of strange characters.	Your printer and the computer may not be communicating correctly. Make sure that you are using the correct interface cable and that the communication protocol is correct. See your computer's manual for more information. Make sure the interface cable is fastened securely to both the printer and the computer.
The print position is not what you expected.	
Printing starts too high or too low on the page.	The loading position may be incorrect. Use micro-adjustment to adjust the loading position. See Chapter 3. If the problem persists, check the top margin set by your application software and adjust it.
Text is printed on the same line.	A line feed signal is not being sent at the end of each line of text. Change the auto line feed setting with DIP switch 2-8. See Chapter 3.
Text is printed with an extra blank line in between.	Two line feed signals are probably being sent. Change the auto line feed setting with DIP switch 2-8. See Chapter 3.

Problem	Solution
The print position is not what you expected (continued).	
Text is printed with an extra blank line in between, even after setting the auto line feed setting to off.	Your interface cable may not be configured correctly. Disable the $\overline{\text{AUTO FEED XT}}$ signal of your interface.
Line spacing is incorrect.	Line spacing is too tight or too far apart. If your application program is capable of sending control codes, specify the line spacing using ESC 0, ESC 2, ESC 3, or ESC A. See Chapter 9.
One line of printing has taken up two lines.	Auto line feed may be on. Turn off DIP switch 2-8. The margin setting may not be correct. Use your application program to change the margin. In BASIC, enter either of the following statements: WIDTH LPRINT 255 WIDTH "LPT1" 255 If the printer still does not print properly, set the right margin to the maximum setting using ESC Q. See Chapter 9.

Problem	Solution
The print position is not what you expected (continued).	
Page length does not match the length of the paper.	The page length may be set incorrectly. Change the page length setting with DIP switches 2-1 and 2-2. See Chapter 3. If your program allows you to send control codes to the printer, specify page size by sending ESC C or ESC C 0. See Chapter 9. If this does not resolve the problem, check the page length set by your application software and adjust it if necessary. If you are using the cut sheet feeder, the self test function prints the number of printable lines that can fit on a single sheet. Use this feature to determine the correct page length setting. See Chapter 5.
Regular gaps occur in the printout.	One-inch skip over perforation may be set. Set DIP switch 1-8 to off. See Chapter 3. If your program allows you to use control codes, use ESC O to cancel skip over perforation. See Chapter 9.

Problem	Solution
The print position is not what you expected (continued).	
Skip over perforation is set, but the perforation does not fall in the center of the skip.	The page length for continuous paper may be set incorrectly. Set DIP switches 2-1 and 2-2 to the correct positions for the page length you want. See Chapter 3. If your program allows you to use control codes, you can also use the ESC C or ESC C 0 command to set the page length. See Chapter 9. The loading position of the paper may be too high or too low. Use the micro-adjustment feature to reset the loading position so that the perforation is centered within the skip area. See Chapter 3. Your application program may be setting the top and bottom margins. If this is the case, turn off skip over perforation by setting DIP switch 1-8 to off.

Problem	Solution
The print position is not what you expected (continued).	
Vertical printed lines do not align or gaps appear in lines or graphics.	The printer is usually set for bidirectional printing. This can cause a slight misalignment of graphics characters. When precise printing of vertical lines is necessary, contact your service center to have them perform the bidirectional print alignment adjustment or select the unidirectional print mode by sending ESC U or ESC < to the printer. You can also select unidirectional printing by setting DIP switch 1-5 to on. See Chapter 3. Unidirectional printing is slightly slower. See Chapter 9.

If the printer still does not print, try the self test described in Chapter 1. If the self test works properly, the printer is all right, and the problem probably lies in the computer, the software, or the cable. If the self test does not work, contact your Epson dealer.

Paper Handling

The following section guides you through problems in handling single sheets and continuous paper. If you are having problems using the optional cut sheet feeder or pull tractor, see the section on options later in this chapter.

Problem	Solution
Single sheets do not feed properly.	
The *LOAD/EJECT button was pressed,* but the *platen* did *not move and paper was not fed.*	You may be trying to feed paper using one of the control panel buttons while the printer is on line (ON LINE light is on). Press the ON LINE button once to take the printer off line; then feed the paper. After feeding the paper, press the ON LINE button again to set the printer on line. See Chapter 3. The cut sheet feeder mode may be turned on (DIP switch 1-7 is on). When you are not using the cut sheet feeder, make sure DIP switch 1-7 is off. See Chapter 3. The left edge guide may be set too far to the right so that the paper detector cannot sense it. Move the paper a little to the left. The PAPER OUT light should go off.

Problem	Solution
Single sheets do not feed properly (continued).	
The LOAD/EJECT button was pressed and the platen rotated, but paper was not fed.	The paper release lever may be set in the wrong position. Push paper release lever back to the single-sheet position. See Chapter 2. The left and right edge guides may be too close together, preventing the paper from feeding smoothly. Adjust the position of the edge guides so that the paper can move up and down freely. See Chapter 2. The paper may not be firmly inserted. When feeding thicker than normal paper, press down lightly on the paper while pressing the LOAD/EJECT button.
When the LOAD/EJECT button is pressed, the paper jams.	The edge guides may be too far apart. Adjust the edge guides to the width of the paper. The dimensions of the paper may exceed the specified limitations. Use only paper sizes that are within the specified range. Multi-part forms cannot be used with this printer's single-sheet feeding system. See Chapter 8. The paper guide may not be attached, or it may not be in the correct position. When printing on single sheets, use the paper guide in its upright position. See Chapter 2.

Problem	Solution
Single sheets do not feed properly (continued).	
When the LOAD/EJECT *button is pressed, the paper feeds through and then out of the printer.*	The paper may have been between the edge guides before the printer was turned on. When loading single sheets, be sure that paper is not in the paper guide before you turn the printer on.
The paper feed is crooked.	The paper guide may not be attached, or it may not be in the correct position. When printing on single sheets, use the paper guide in its upright position. The paper may be dog-eared. Use new paper.
The paper does not fully eject.	You may be trying to eject the paper using the FORM FEED button. Always press the LOAD/EJECT button to eject the paper. The page length setting may be wrong. If the page length is incorrectly set by your software, the paper may not fully eject. Check your software settings.

Problem	Solution
Continuous paper does not feed properly.	
When the LOAD/EJECT button is pressed, the platen does not rotate and paper does not feed.	You may be trying to feed paper using the control panel buttons while the printer is on line (ON LINE light on). Press the ON LINE button once to take the printer off line, then try feeding paper. After feeding paper, press the ON LINE button again to set the printer on line. See Chapter 3. The paper release lever may be pushed back to the single-sheet position. When using the push tractor, be sure the paper release lever is pulled forward to the continuous paper position. See Chapter 2.
When the LOAD/EJECT button is pressed, the platen rotates but paper does not feed.	Continuous paper may have already been in the paper path. (In this case, the paper feeds backward to the standby position.) Press the LOAD/EJECT button again to load the paper.

Problem	Solution
Continuous paper does not feed properly (continued).	
The paper feed *is crooked or the paper jams.*	The paper supply may be obstructed by a cable or some other object. Make sure that the paper feeds smoothly into the printer. See Chapter 2. Your supply of continuous paper may be too far from the printer. Position your paper supply within 3 feet (1 meter) of the printer. See Chapter 2. The paper may be caught on the edge guides. When using continuous paper, make sure that the paper guide is installed over the paper and that the edge guides are positioned in the center. See Chapter 2. The holes on the sides of the paper may not be aligned with each other. Reposition the paper on the tractor pins. See Chapter 2. The sprocket units are incorrectly positioned for the paper width. Move the right sprocket unit to remove any slack across the width of the paper. See Chapter 2. The position of your paper supply may be preventing it from feeding straight. See Chapter 2.

Problem	Solution
Continuous paper does not feed properly (continued).	
The paper feed *is crooked or the paper jams (continued).*	The sprocket lock levers may be unlocked, or the sprocket covers may be open. Position the sprocket units to match the width of your paper. Then, lock them in place by pressing the sprocket lock levers away from you. See Chapter 2. The paper guide may be in the upright position. When using continuous paper, make sure that the paper guide is in the lowered position so that it can act as a paper separator. See Chapter 2. The paper thickness lever may be in the wrong position. For printing on ordinary paper, always set the lever to position 2. The paper dimensions may exceed the specified limitations. Use only paper sizes that are within the specified range. Your printer can print on continuous multi-part forms consisting of 1 original and 3 copies. See Chapter 8.
Regular gaps occur in the printout.	Skip over perforation may be interfering with your application program settings. Set DIP switch 1-8 to off. If your program allows you to use control codes, you can use ESC O to cancel skip over perforation.

Problem	Solution
Continuous paper does not feed properly (continued).	
Skip over perforation does not function.	You may not have turned off the power after setting DIP switch 1-8 to ON. To make new DIP switch settings effective, turn the power off, then on again.
Skip over perforation is set, but the perforation does not fall in the center of *the skip.*	The page length for one page of continuous paper may be set incorrectly. Set DIP switches 2-1 and 2-2. See Chapter 3. You can also use control codes ESC C or ESC C 0 to set the page length correctly. See Chapter 9. The loading position of the paper may be too high or too low. Use the micro-adjustment to reset the loading position. See Chapter 3.
The loading position of *the paper shifts slightly while printing several pages.*	The paper you are trying to feed may be too heavy for the built-in push tractor. When highly accurate paper feed is necessary, such as when printing carbon copies, use the optional pull tractor.
After printing stops, the paper automatically feeds forward.	The short tear-off function may be selected. When you resume printing, the paper feeds backward to its loading position. If you do not need this function, set DIP switch 2-7 to off. See Chapter 3.

Problem	Solution
Continuous paper does not feed properly (continued).	
The short tear-off function is *selected (DIP switch 2-7 is on), but it does not work.*	You may not have turned off the power after setting the DIP switch. To make new DIP switch settings effective turn the power off, then on again. There may still be data in the print buffer. The short tear-off function works only if the data in the print buffer is completely printed and the next print position is at the top of the next page. Your program may not be sending a form feed command to the printer. At the end of your program or the page, send a form feed (FF). If you are using BASIC, be sure to add a semicolon (;) after the FF code to prevent any additional codes from being sent to the printer.
The LOAD/EJECT button is *pressed* to *eject the paper, the paper* feed stops, *and paper does not fully eject or it jams.*	You may have tried to back feed too many pages. Before ejecting the paper, always tear off the last printed page. See Chapter 2 You may be trying to eject labels. Labels may jam when they are fed backward, so always use the FORM FEED button and feed labels forward to eject them.

Problem	Solution
Continuous paper does not feed properly (continued).	
When printing labels, the labels either do not feed or feed *incorrectly.*	You may not be using the correct type of labels. Read through the section on printing on special paper for the correct type of labels to use. See Chapter 2. You may be trying to back-feed labels through the printer. This can cause labels to come off their backing and jam the printer. Do not feed labels using the LOAD/EJECT button. Also, make sure that DIP switch 2-7 (short tear-off) is off. If a label does become jammed in the printer mechanism, see your Epson dealer for assistance.
Switching between single sheets and continuous paper cannot be performed properly.	
When the LOAD/EJECT button is pressed to load continuous paper, the platen does not rotate and the paper is not loaded.	Pull the paper release lever forward to the continuous paper position, set the paper, then press the LOAD/EJECT button. See Chapter 2.

Problem	Solution
Switching between single sheets and continuous paper cannot be performed properly (continued).	
The paper release lever is correctly set for continuous paper, but when the LOAD/EJECT button is pressed, the platen rotates backward and the paper comes off the sprockets.	A single sheet may be in the paper guide, causing the continuous paper to back out and to come off the sprockets. When using continuous paper, always make sure to remove any single sheets remaining in the paper guide. See Chapter 2.
When the LOAD/EJECT button is pressed to load a single sheet from the paper guide, the platen rotates in reverse, the single sheet does not load, and the continuous paper comes off the sprockets.	The paper release lever may not be in the proper position. Push the lever back to the single-sheet position, set the paper, then press the LOAD/EJECT button.

Problem	Solution
Switching between single sheets and continuous paper cannot be performed properly (continued).	
Even with the paper release lever set correctly to the single-sheet position, the single sheet and continuous paper feed *together and jam.*	The continuous paper may not have fed backward far enough to reach the standby position before you changed the position of the paper release lever. Remove the jammed paper and try again. Also, check that the PAPER OUT light comes on before changing the position of the paper release lever to make sure that the continuous paper is completely ejected. When there is more than one page to eject, you must press the LOAD/EJECT button more than once. See Chapter 2.
The short tear-off function does not operate properly.	
One page is completely printed, but the paper does not feed.	DIP switch 2-7, short tear-off mode, may be set to off. Set DIP switch 2-7 to on to turn on the short tear-off mode.
Printing ended in the middle of *a page.*	One page of data may not have been sent to the printer. Finish the page by sending a form feed code (FF) to the printer or by sending enough line feed codes (LF) to advance the remainder of the page.

Options

Problem	Solution
Using the cut sheet feeder, the paper does not feed properly.	
The LOAD/EJECT button is pressed, but the platen does not move and the paper does not feed.	You may be pressing the LOAD/EJECT button while the printer is on line. Always take the printer off line before feeding the paper. Paper feeds automatically when the cut sheet feeder receives a print command from the computer (only while the printer is on line).
After a print command is sent from the computer, the platen does not move and the paper does not feed.	The printer may be off line. Press the ON LINE button to put the printer on line. The cut sheet feeder mode may be off. Set DIP switch 1-7 to on. If your program allows you to use control codes, use ESC EM 4 to set the cut sheet feeder mode. The printer must be ready with no paper out condition to receive this command. Send the command with continuous paper loaded and with the paper select lever in the continuous position.

Problem	Solution
Using the cut sheet feeder, the paper does not feed properly (continued).	
After *a* print *command is sent from the computer, the platen rotates, but paper does not feed. The PAPER OUT light is on.*	DIP switch 1-7 is set to off. DIP switch 1-7 must be set to on in order to use the cut sheet feeder. See Chapters 3 and 5. The cut sheet feeder may be incorrectly installed on the printer. Remove and reinstall the cut sheet feeder making sure that the mounting notches are properly mated with the pins on the printer. See Chapter 5. The cut sheet feeder may be out of paper. Load more paper in the cut sheet feeder's bin. The paper release lever may not be in the single-sheet position. Push the lever back to the single-sheet position. See Chapter 5. The paper set levers may be pulled forward. After loading a stack of paper in the cut sheet feeder, push the paper set levers backward. See Chapter 5. The left and right paper guides may be too close together, preventing smooth paper feed. Adjust the position of the paper guides so that the paper can move up and down freely. See Chapter 5.

Problem	Solution
Using the cut sheet feeder, the paper does not feed properly (continued).	
After a print command is sent from the computer, the platen rotates, but paper does not feed. *The PAPER OUT light is on (continued).*	Paper may be jammed near the print head. Remove the paper jam (temporarily remove the cut sheet feeder if necessary). You may have loaded too many sheets in the cut sheet feeder's bin. Remove the sheets. The bin can hold a maximum of *150* sheets. There may be only one sheet left in the bin. The last sheet in the bin may not feed, so add more paper.
Two or more sheets feed *at the same time.*	You may have loaded too many sheets in the cut sheet feeder's bin. Remove the sheets. The bin can hold a maximum of *150* sheets. You may have forgotten to fan the stack of paper before loading it into the bin. Remove the paper and fan it. Then align the edges of the stack. See Chapter 5.

Problem	Solution
Using the cut sheet feeder, the paper does not feed properly (continued).	
The paper feed is *crooked.*	The paper may be old or creased. Discard it and load new, clean sheets of paper. The left and right paper guides may be too far apart. Adjust the paper guides to the width of the paper. There may be too much outgoing paper. Never let more than 80 sheets of outgoing paper accumulate while printing. The weight of your paper may be too heavy or too light for the cut sheet feeder. Refer to the specifications in Chapter 8 and make sure that your paper is the proper size and quality.
You tried to manually insert a single sheet, but instead paper was fed from the cut sheet feeder's *bin.*	The single sheet may have been inserted in the wrong place. Check it and try again. See Chapter 5. Paper may feed from the bin if you try to insert several single sheets. To insert several single sheets, pull the paper set levers forward.

Problem	Solution
Using the cut sheet feeder, the paper does not feed properly (continued).	
One page of *printing has spread to two pages.*	The page length setting may be wrong. Run a self test in cut sheet feeder mode. The printer will automatically measure the paper loaded and set the correct page length. See Chapter 5. You may have to change the top or bottom margin or page length for your application program.
When printing envelopes, the envelopes either do not feed *or feed incorrectly.*	The two front levers may not be set to envelope feeding. Push down on the two front levers until they lock into position. See Chapter 5.
Using the pull tractor with the push tractor, continuous paper does not feed properly.	
The FORM FEED or LINE FEED button was pressed, but the paper does not feed at all. (Platen does not rotate.)	The printer may be on line. Before using the control panel buttons to feed paper, always take the printer off line (ON LINE light out).

Problem	Solution
Using the pull tractor with the push tractor, continuous paper does not feed properly (continued).	
Paper feed is crooked or the paper jams.	Something may be obstructing the paper feed, like an object on top of the paper stack or a cable caught on the paper. Make sure that nothing prevents the smooth flow of paper and position the paper so that it feeds straight in line with the sprockets. The supply of paper may be too far from the printer. Position the paper supply so that it is less than three feet or one meter away. The paper may be caught on the edge guides. When using continuous paper, make sure that the paper guide is lowered over the paper and that the edge guides are moved to the center of the paper's width. See Chapter 2. The pull tractor and push tractor sprockets are not aligned correctly. When using both tractors, be sure that the sprockets on both are positioned evenly. See Chapter 5.

Problem	Solution
Using the pull tractor with the push tractor, continuous paper does not feed properly (continued).	
Paper feed is *crooked or the paper jams (continued).*	The paper may be slack. Adjust the position of the sprockets to take up any slack along the width of the paper. Remove slack lengthwise by pressing in and rotating the pull tractor knob on the right. Do not turn the platen knob. The paper thickness lever may not be correctly set. Set the paper thickness lever to match the thickness of your paper. The paper may not meet the specifications. Check that your paper is the proper size, weight, and thickness.
Several lines of *space occur in the printout.*	Skip over perforation may be set. Set DIP switch 1-8 to off.
Skip over perforation is set, but it does not work.	You may have changed the DIP switches with the power on. To make new DIP switch settings effective, turn the power off, then on again.

Problem	Solution
Using the pull tractor with the push tractor, continuous paper does not feed properly (continued).	
Skip over perforation is set, but the skip has shifted from the perforation, or the perforation does not fall in the center of the skip.	The page length for one page of the continuous paper may be set incorrectly. Use DIP switches 2-1 and 2-2. See Chapter 3. You can use control codes ESC C or ESC C 0 to set the correct page length. See Chapter 9. The loading position of the paper may be too high or too low. Use the micro-adjustment feature to reset the loading position. See Chapter 3.
When the printing ends the paper feeds abruptly, and as it resumes printing, the paper feeds backward and comes off the pull tractor sprockets.	The short tear-off function may be selected. The short tear-off function cannot be used with the pull tractor, so be sure to set DIP switch 2-7 to off. See Chapter 3.
When the LOAD/EJECT button is pressed to eject the paper, the paper comes off the pull tractor sprockets.	When the paper release lever is in the continuous paper position, the paper feeds backward to eject. When using the pull tractor, press the FORM FEED button to feed the paper forward to eject. See Chapter 5.

Problem	Solution
Using an optional interface, the printer does not operate properly.	
The printer does not print or the printout is not what you expected.	The interface board may be loose or not properly connected. Check that the interface board is correctly inserted into the connector on the main board. See Chapter 5. You may be trying to use an interface with the wrong specification. Check the specifications to make sure that you can use the interface with this printer. See Chapter 5. The DIP switch settings may not be set correctly. Make sure that DIP switches 2-3 and 2-4 are set for parallel, regardless of whether the optional interface board is parallel or serial. See Chapter 3. You can also check the current DIP switch settings by running the self test. You may be trying to use a cable with the wrong specification. Make sure that the cable matches the specifications of the interface. The DIP switches or jumpers on the interface board may be set wrong. See the interface manual for the correct settings.

Problem	Solution
Using an optional interface, the printer does not operate properly (continued).	
The printer does not print or the printout is not what you expected (continued).	The interface settings on the computer may be wrong. See your computer manual for the correct settings. The computer and interface settings may not match. Match the settings for each condition. Two cables may be installed on the printer; only one cable may be attached at any time.

If the printer still does not operate properly after checking the above points, run a self test of the interface to make sure that there are no on-board defects. If any abnormality is found, contact your Epson dealer.

Note: If you are still having problems after working through the solutions in this section, you may want to try using the data dump mode, a mode that helps advanced users determine the causes of communication problems between the printer and the computer. See Data Dump Mode in Chapter 3 for more information.

Chapter 8
Technical Specifications

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Printer Specifications

Printing

Print method: 24-pin impact dot matrix

Print speed:

Quality	Characters per Inch	Characters/second/line
SuperDraft	10	300
Normal draft	10	246
	12	295
Letter Quality	10	82
	12	98

Printing direction: Bidirectional logic-seeking for text and graphics. Unidirectional for graphics. (Unidirectional can be selected with a DIP switch or by using the proper software command.)

Line spacing: l/6 inch or programmable in increments of l/360 inch

Paper feed speed: Single sheet: 3.0 inches per sec (60 ms/line)

Continuous: 2.7 inches per sec (65 ms/line)

Printable columns:

Character spacing	Maximum printed characters	
	LQ-850	LQ-1050
10 cpi	80	136
10 cpi condensed	137	233
12 cpi	96	164
12 cpi condensed	160	272

Buffer: 6KB or 0KB (panel button selectable)

Character fonts:

Font	Available sizes (Characters per inch)	Family number
Draft	**10, 12, 15**	
Epaon Roman	**10, 12, 15, Proportional**	**0**
Epson Sans Serif	**10, 12, 15, Proportional**	1
Epson Courier	**10, 12, 15**	**2**
Epson Prestige	**10, 12, 15**	**3**
Epson Script	**10, 12, 15**	**4**
OCR-B	**10**	**5**
OCR-A	**10**	**6**
Epson Orator	**10**	**7**
Epson Orator-S	**10**	**8**

Characters:

96 standard ASCII character set (including italic characters)

14 international character sets

1 Legal character set

Epson Extended Graphics character set

5 graphics character sets

Paper

Paper feeding methods: Friction

Built-in push feed tractor with paper tension unit

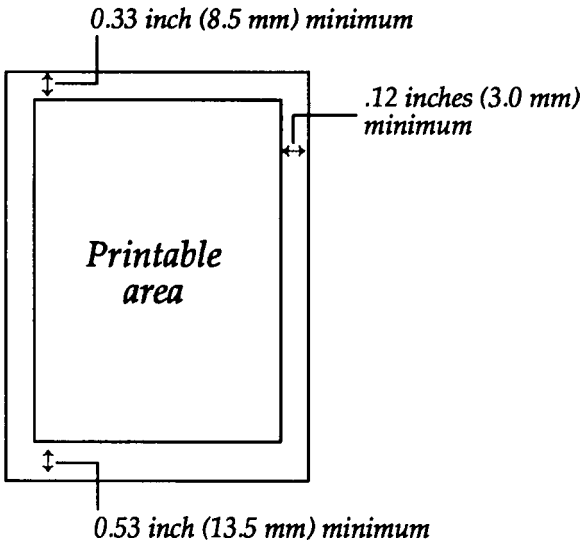
Pull tractor (optional)

Single-bin or double-bin cut sheet feeder (optional)

Paper width and length:

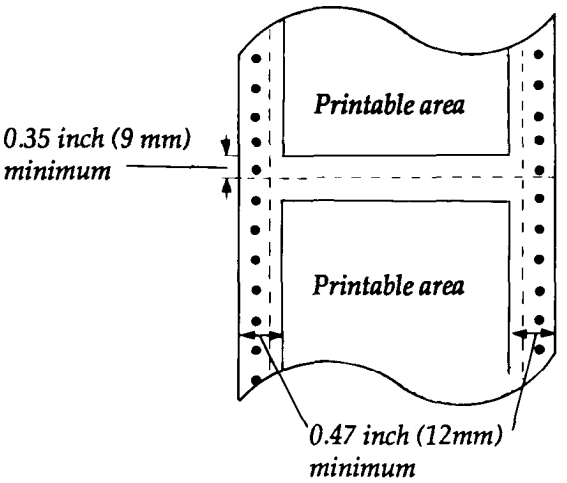
Paper	LQ-850	LQ-1050
Single sheet		
width	7.2 to 10.1 inches (182 to 257 mm)	7.2 to 14.3 inches (182 to 364 mm)
length	7.2 to 14.3 inches (182 to 364 mm)	7.2 to 14.3 inches (182 to 364 mm)
Continuous paper		
width	4.0 to 10.0 inches (101 to 254 mm)	4.0 to 16.0 inches (101 to 406 mm)
Envelopes	No. 6 6.54 x 3.62 inches (166 x 92 mm) No. 10 9.45 x 4.09 inches (240 x 104 mm)	
Labels	2.5 x 0.94 inch (63.5 x 23.8 mm) minimum	

Printable area: Single sheet



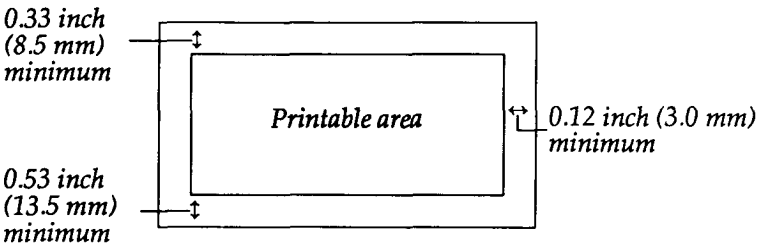
Note: For the LQ-850, printing on paper from 9 to 10.1 inches wide increases the minimum right and left margins to 0.53 inches.

Continuous paper



Note: The minimum for the right and left margins increases to 0.98 inch (25.0 mm) when printing on IO-inch wide paper on the LQ-850 or on l6-inch wide paper on the LQ-1050.

Envelope



Note: Envelope printing is only available at normal operating conditions. Load the envelope with its long side horizontal.

Paper weight:	Single Sheet	14 lb to 24 lb
	Continuous	14 lb to 22 lb
	Multi-part forms	12 lb to 15 lb per sheet. Maximum number sheets = 4
	Envelope	12 lb to 24 lb
Paper thickness:	Single Sheet	0.0025 to 0.0055 inch (0.065 to 0.14 mm)
	Continuous	0.0025 to 0.012 inch (0.065 to 0.32 mm)
	Envelope	0.0063 to 0.0197 inch (0.16 to 0.52 mm)
	Label	maximum 0.0075 inch (0.19 mm)
Number of copies:	One original plus up to 3 copies (at normal temperature)	
	One original plus up to 2 copies (all temperature ranges)	
	Total thickness must not exceed 0.012 inch (0.32 mm)	

Notes:

- The use of 24 lb paper is only available at normal temperature.
- Printing past the edge of envelopes, multi-part forms, labels, or paper that is thicker than normal can damage the print head.
- Labels with a pressure sensitive covering, either glued or tacked onto the backing sheet, can be printed under the conditions listed below. The total thickness may not exceed 0.0118 inch (0.3 mm).

  - The temperature range is between 41°F and 95°F (5 to 35°C).
  - The relative humidity is between 10 and 80 percent.

Mechanical

Ribbon: Black ribbon cartridge #7753/#7754:

Life expectancy (in Letter Quality characters, at 48 dots/character)
2 million characters

Film ribbon cartridge #7768/#7770:

Life expectancy (in Letter Quality characters)

#7768: 0.2 million characters
#7770: 0.3 million characters

MCBF: For all components excluding print head: 5,000,000 lines

MTBF: LQ-850: 4000 power-on hours (at 25% duty)

LQ-1050: 6000 power-on hours (at 25% duty)

Print head life: 200 million strokes per wire

Dimensions and weight:

	LQ-850 (80)	**LQ-1050 (136)**
Height	5.6 inches (142 mm)	**5.6** inches (142 mm)
Width	17.0 inches (430 mm)	**23.8** inches (606 mm)
Depth	14.2 inches (360 mm)	14.2 inches (360 mm)
Weight	approx. 19.8 lb (9 kg)	approx. 26.4 lb (12 kg)

Electrical

Voltage:	120 VAC ± 10%
Power consumption:	(self test printing: draft mode) LQ-850: 55 W LQ-1050: 60 W
Frequency:	49.5 ± 0.5 Hz
Insulation resistance:	10M ohms between AC power line and chassis
Dielectric strength (between AC line and chassis):	Can withstand 1.00 kV rms applied for one minute or 1.20 kV rms applied for one second

Environmental

Temperature:	Operation: 41°F to 95°F (5°C to 35°C) Storage: -22°F to 150°F (-30°C to 65°C)
Humidity (without condensation):	Operation: 10% to 80% Storage: 5% to 85%
Operation angle:	Less than 15° (without cut sheet feeder) 0° (with cut sheet feeder)
Shock:	Operation: Up to 1 G within 1 ms Storage: Up to 2 G within l ms
V&ration:	Operation: Up to 0.25 G at up to 55 Hz Storage: Up to 0.50 G at up to 55 Hz

Interface Specifications

Your printer is equipped with both a parallel and a serial interface. For specifications on optional interfaces, see the manuals provided with the interfaces.

Parallel Interface

Pin assignments for the parallel interface

Connector pin assignments and a description of their respective interface signals are shown in the following table.

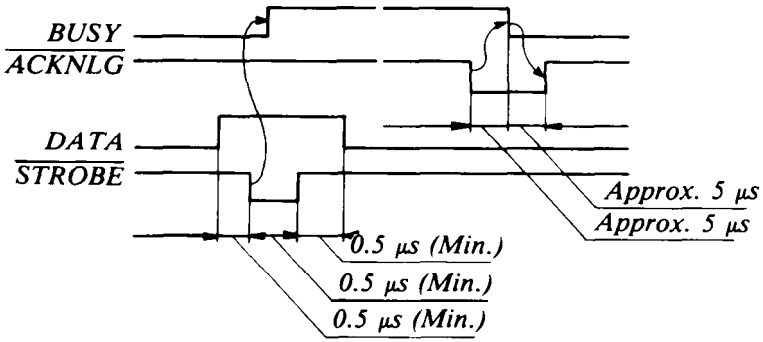
Signal Pin	Return Pin	Signal	Direction	Description
1	19	STROBE	IN	STROBE pulse to read data. Pulse width must be more than 0.5 microseconds at the receiving terminal.
2	20	DATA 1	IN	These signals represent information of the 1st to 8th bits of parallel data, respectively. Each signal is at HIGH level when data is logical 1 and LOW when it is logical 0.
3	21	DATA 2	IN	
4	22	DATA 3	IN	
5	23	DATA 4	IN	
6	24	DATA 5	IN	
7	25	DATA 6	IN	
8	26	DATA 7	IN	
9	27	DATA 8	IN	
10	28	$\overline{\text{ACKNLG}}$	OUT	About an 11 -microsecond pulse. LOW indicates that data has been received and that the printer is ready to accept
11	29	BUSY	OUT	A HIGH signal indicates that the printer cannot receive data. The signal goes HIGH in the following cases: 1) During data entry (ea. char. time) 2) During printing 3) When off line 4) During printer-error state

Signal Pin	Return Pin	Signal	Direction	Description
12	30	PE	OUT	A HIGH signal indicates that the printer is out of paper.
13	—	SLCT	OUT	Pulled to +5 volts through 3.3 Kohm resistance.
14	— — —	$\overline{\text{AUTO}}$ $\overline{\text{FEED}}$ $\overline{\text{XT}}$	IN	When this signal is LOW, the paper is automatically fed 1 line after printing. (The signal level can be fixed to this by setting DIP switch 2-8 to on.)
15	—	NC	—	Not used.
16	—	GND	—	Logic ground level.
17	— —	CHASSIS GND	— —	Printer's chassis ground, which is isolated from the logic ground.
18	—	NC	—	Not used.
19-30	—	GND	—	Twisted-pair return signal ground level.
31		$\overline{\text{INIT}}$	IN	When this level becomes LOW, the printer controller is reset to its power-up state and the print buffer is cleared. This level is normally HIGH; its pulse width must be more than 50 microseconds at the receiving terminal.
32	—	$\overline{\text{ERROR}}$	OUT	This level becomes LOW when the printer is: 1) in paper out state 2) off line 3) in error state.
33	—	GND	—	Same as for Pins 19-30.
34	—	NC	—	Not used.
35	—	—	OUT	Pulled up to 5V through 3.3 Kohm resistance.
36	—	$\overline{\text{SLCT IN}}$	IN	The DC1/DC3 code is valid only when this signal is HIGH. (Internal fixing can be carried out with Jumper J1. The level of this signal is factory-set to LOW.)

- The column heading "Direction" refers to the direction of signal flow as viewed from the printer.
- "Return" denotes the twisted-pair return, to be connected at signal ground level. For the interface wiring, be sure to use a twisted-pair cable for each signal and to complete the connection on the return side. These cables should be shielded and connected to the chassis of the host computer and the printer.
- All interface conditions are based on TTL level. Both the rise and the fall times of each signal must be less than 0.2 microseconds.
- Data transfer must be carried out by observing the $\overline{\text{ACKNLG}}$ or BUSY signal. Data transfer to this printer can be carried out only after receipt of the $\overline{\text{ACKNLG}}$ signal or when the level of the BUSY signal-is LOW.

Interface timing

The figure below shows the timing for the parallel interface.



Printing enabled/disabled signals and control conditions

The table below shows the relationship between printing being enabled or disabled, the on line/off line status, and the receipt of the data on/off control characters, DC1 or DC3.

ON LINE (Indicator on)	$\overline{\text{SLCT IN}}$	DC1/DC3 (Data on/off control)	$\overline{\text{ERROR}}$	BUSY	$\overline{\text{ACKNLG}}$	Printing (Disabled/ enabled)
on line	Low (J9 interface)	DC1/DC3 (no effect)	High	High/Low	Pulsed ea. char.	Enabled (normal cond.)
on line	High	DC1 Recv'd	High	High/Low	Pulsed ea. char.	Enabled
on line	High	DC3 Recv'd	High	High/Low	Pulsed ea. char.	Disabled*
off line	High/Low (no effect)	DC1/DC3 (no effect)	Low	High	Not generated	Disabled

- While printing is disabled, character data is being received and acknowledged so that the printer can look for another DC1 character, which would allow it to resume printing.

Serial Interface

The LQ built-in serial interface is an RS-232C asynchronous interface with the following characteristics:

Data format

1 start bit
Data word length: 8 bit
Odd, **even,** or no parity
1 stop bit

Baud rate

300, 1200, 9600, 19200 bits per second

Signal level

Mark (1) -3 V to -27 V
Space (0) +3 V to +27 V

Handshaking

Handshaking by DTR signal or X-on/X-off. The DTR signal changes to mark-meaning the printer is not ready to receive data-when the number of bytes free in the input buffer goes down to 256. The signal changes to space-meaning that the printer is now ready-when the number of bytes in the input buffer rises to 528.

Error handling

A * character is printed if a parity error is detected. All other errors are ignored.

Connector

6-pin DIN connector

In this table, the direction of signals is given relative to the printer.

Pin number	Signal	Signal direction	Direction
1	TXD	out	Transmits data for X-on/X-off
2	DTR	out	Indicates whether or not the printer is ready to receive data. "Mark" level indicates printer is not ready to receive data.
3	RXD	in	Receives data
4	Not used		
5	SG	-	Signal (logic) ground level
6	CG	-	Printer chassis ground

Option Specifications

Cut Sheet Feeder

Dimensions and weight:

Option no.	Height	Width	Depth	Weight
#7339	13.6 inches (345 mm)	16.93 inches (430 mm)	14.33 inches (364 mm)	4.84 lbs (2.2 kg)
#7340	13.6 inches (345 mm)	23.82 inches (605 mm)	14.33 inches (364 mm)	6.6 lbs (3.0 kg)
#7346	14.45 inches (367 mm)	16.93 inches (430 mm)	20.20 inches (513 mm)	7.48 lbs (3.4 kg)
#7348	14.45 inches (367 mm)	23.82 inches (605 mm)	20.20 inches (513 mm)	9.9 lbs (4.5 kg)

Dimensions: mounted on printer.

Bin and Stacker capacity:

Single sheet: Up to 150 sheets of 22 lb ($82 g/m^2$) paper

Up to 185 sheets of 17 lb ($64 g/m^2$) paper

(total thickness should be up to 0.59 inch or 15 mm)

Envelopes:* Up to 25 (plain and bond type)

Up to 30 (air mail)

*For double-bin cut sheet feeder, envelopes can only be used in bin 1.

Reliability (total cycle* of *bin 1 and bin 2)

MCBF: 100,000 cycles

Paper:

		Single sheets bin 1 and bin 2	Envelopes bin 1
Paper width	#7339 #7346	7.17 to 8.50 inches (182 to 216 mm)	6.50 to 9.49 inches 166 to 241 mm)
	#7340 #7348	7.17 to 14.33 inches (182 to 364 mm)	6.50 to 9.49 inches (166 to 241 mm)
Paper length		8.27 **to** 12.00 inches	3.62 to 4.09 inches
Paper thickness		0.0028 to 0.0039 inch (0.07 to 0.10 mm)	0.0063 to 0.0205 inch (0.16 to 0.52 mm)
Paper weight		17 to 22 lb paper (64 to 82 g/m^2)	12 to 24 lb paper (45 to 91 g/m^2)

Paper storage condition: Temperature: 64°F to 72°F (18°C to 22°C)
Humidity: 40% to 60%

Environmental

Temperature: Operation: 41°F to 95°F (5°C to 35°C)
Storage: -22°F to 158°F (-30°C to 70°C)

Humidity (without condensation): Operation: 15% to 80%
Storage: 5% to 90%

Notes:

- 24 lb paper printing is only available at normal operating conditions.
- Envelope printing is only available at normal operating conditions.

Initialization

There are three ways that the printer can be initialized (returned to a fixed set of conditions).

Hardware initialization	• The power is turned on. • The printer receives an INIT signal at the parallel interface (pin 31 goes LOW).
Software initialization	• The software sends the ESC @ (initialize the printer) command.

These three kinds of initialization have slightly different effects. In particular, ESC @ does not initialize the printer mechanism, clear the input data buffer, or clear the user-defined character set.

Default Settings

The following table shows the default conditions that become valid when the printer is initialized.

Item	Reset to:
Top of form position	Current paper position
Left and right margins	Cancelled
Line spacing	1/6-inch line spacing
Vertical tab position	Cleared
Horizontal tab positions	Every eight characters
VFU channel	Channel 0
Font selection	The current FONT button setting
Character spacing	The current PITCH button setting
Condensed mode	The current CONDENSED button setting
Special printing effects	Cancelled (except condensed printing)
User-defined characters	Hardware: Cleared Software: Deselected only
Justification	Left justification
Graphic mode assignment	ESC K = ESC*0, ESC L = ESC*1, ESC Y = ESC*2, ESC Z = ESC*3

In addition, the data buffer is cleared when the printer is initialized by turning on the power or by sending an INlT signal.

Note: The user-defined character set is not cleared when the printer is initialized by ESC @.

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Command Summary

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Using the Command Summary

This chapter lists and describes all the commands available on the printer.

The first part of this chapter lists all commands in numerical order and gives the number of the page where each is fully described. If you know which command you are looking for, consult the numerical list.

> Note: The Quick Reference card at the end of the book also contains a list of the commands divided by topic, with page number references that direct you to full explanations of the **commands.**

The second part of this chapter lists and describes each command separately; the commands are divided into the following subjects:

Printer operation	Print size and character width
MSB control	Print enhancement
Data control	Word processing
Vertical motion	Character sets
Horizontal motion	User-defined characters
Overall printing style	Graphics

Each command has a format section and a comments section. The format section gives the ASCII, decimal, and hexadecimal codes for the command. The comments section describes the effect of the command and gives any additional information necessary for using it.

The format section includes:

ASCII:	the sequence in standard ASCII characters
Decimal:	the sequence in decimal numbers
Hexadecimal:	the sequence in hexadecimal numbers

All three formats are equivalent, so you can pick the one best suited to your purpose. Variables are represented by italicized letters such as n, nl, and m. The variables are explained in the comments section.

Note: Some application programs use control key sequences. See the Control Key Chart later in this chapter.

Examples

The simplest type of command consists of a single character to be sent to the printer. For instance, to print in condensed mode, the code format is:

ASCII code:	SI
Decimal:	15
Hexadecimal:	OF

This code can be sent from a program by sending the code 15 directly.

More complex commands consist of two or more character codes. For example, to print in double-wide mode, the code format is the following:

ASCII code:	ESC	W	n
Decimal:	27	87	n
Hexadecimal:	1B	57	n

In this case n can be either 1 (on) or 0 (off), to begin or end double-wide printing. You can use either of the following commands to turn on double-wide print from BASIC:

```
LPRINT  CHR$(27);CHR$(87);CHR$(l)
LPRINT  CHR$(27);"W";CHR$(l)
```

For the following commands that use only 0 or 1 for the variable, either the decimal or hexadecimal values 1 and 0 or the ASCII characters 1 and 0 can be used:

ESC U, ESC x, ESC p, ESC W, ESC S, ESC-, ESC %, and ESC w.

For example, in BASIC you can turn on proportional spacing with either of these statements:

```
LPRINT  CHR$(27);"p";CHR$(l)
LPRINT  CHR$(27);"p";"l"
```

Control Key Chart

Some application programs use control key codes for decimal values O-27. The table below gives you the proper values. The Control Key column indicates that you press the control key at the same time you press the key for the letter or symbol in that column. For example, you press the control key and A at the same time to send the value 1.

Some application programs that use this system cannot use Control-@, and many programs use the control keys for other purposes.

Dec.	Hex.	**Ctrl.** Key
0	00	@
1	01	A
2	02	B
3	03	C
4	04	D
5	05	E
6	06	F
7	07	G
8	08	H
9	09	I
10	OA	J
11	OB	K
12	o c	L
13	OD	M

Dec.	Hex.	Ctrl. Key
14	OE	**N**
15	OF	**O**
16	10	P
17	11	Q
18	12	R
19	13	S
20	14	T
21	15	U
22	16	V
23	17	W
24	18	X
25	19	Y
26	1A	Z
27	1B	[

Commands in Numerical Order

The following list shows control codes and ESC sequences with their decimal and hexadecimal values, and the page where the description of the command can be found.

ASCII	Dec.	Hex.	Description	Page
BEL	7	07	Beeper	9-12
BS	8	08	Backspace	9-20
HT	9	09	Tab Horizontally	9-21
LF	10	OA	Line Feed.	9-15
VT	11	OB	Tab Vertically	9-17
FF	12	oc	Form Feed	9-13
CR	13	OD	Carriage Return	9-12
s o	14	OE	Select Double-wide Mode (one line)	9-26
SI	15	OF	Select Condensed Mode	9-25
DC1	17	11	Select Printer.	9-8
DC2	18	12	Cancel Condensed Mode	9-26
DC3	19	13	Deselect Printer	9-9
DC4	20	14	Cancel Double-wide Mode (one line)	9-27
CAN	24	18	Cancel Line	9-12
DEL	127	7F	Delete Character.	9-9
ESC SO	14	OE	Select Double-wide Mode (one line)	9-27
ESC SI	15	OF	Select Condensed Mode	9-26
ESC EM	25	19	Control Cut Sheet Feeder	9-10
ESC SP	32	20	Set Intercharacter Space	9-33
ESC!	33	21	Master Select.	9-23
ESC #	35	23	Cancel MSB Control.	9-11
ESC $	36	24	Set Absolute Print Position.	9-20
ESC %	37	25	Select User-defined Set	9-37
ESC &	38	26	Define Userdefined Characters	9-36
ESC (-	40	28	Select Score	9-31

ASCII	Dec.	Hex.	Description	Page
ESC *	42	2A	Select Graphics Mode	9-39
ESC +	43	2B	Set n/360-inch Line Spacing. ...	9-15
ESC -	45	2D	Turn Underline Mode On/Off	9-32
ESC /	47	2F	Select Vertical Tab Channel	9-18
ESC 0	48	30	Select 1/8-inch Line Spacing ...	9-15
ESC 2	50	32	Select 1/6-inch Line Spacing ...	9-16
ESC 3	51	33	Set n/180-inch Line Spacing. ...	9-16
ESC 4	52	34	Select Italic Mode.	9-34
ESC 5	53	35	Cancel Italic Mode	9-35
ESC 6	54	36	Enable Printable Characters	9-37
ESC 7	55	37	Enable Upper Control Codes ...	9-37
ESC :	58	3A	Copy ROM to RAM.	9-36
ESC <	60	3C	Select Unidirectional Mode (one line)	9-9
ESC =	61	3D	Set MSB to 0	9-11
ESC >	62	3E	Set MSB to 1	9-11
ESC ?	63	3F	Reassign Graphics Mode	9-40
ESC @	64	40	Initialize Printer	9-8
ESC A	65	41	Set n/60-inch Line Spacing.	9-16
ESC B	66	42	Set Vertical Tabs.	9-17
ESC C	67	43	Set Page Length in Lines.	9-13
ESCCO	67	43	Set Page Length in Inches.	9-14
ESC D	68	44	Set Horizontal Tabs	9-22
ESC E	69	45	Select Emphasized Mode	9-28
ESC F	70	46	Cancel Emphasized Mode	9-29
ESC G	71	47	Select Double-strike Mode	9-29
ESC H	72	48	Cancel Double-strike Mode	9-29
ESC J	74	4A	Perform n/180-inch Line Feed. .	9-17
ESC K	75	4B	Select Single-density Graphics Mode	9-38
ESC L	76	4C	Select Double-density Graphics Mode	9-38
ESC M	77	4D	Select 12 CPI	9-24

ASCII	Dec.	Hex.	Description	Page
ESC N	78	4E	Set Skip Over Perforation	9-14
ESC O	79	4F	Cancel Skip Over Perforation. ..	9-14
ESC P	80	50	Select 10 CPI	9-24
ESC Q	81	51	Set Right Margin	9-19
ESC R	82	52	Select an International Character Set.	9-35
ESC S 0	83	53	Select Superscript Mode	9-30
ESC S l	83	53	Select Subscript Mode.	9-30
ESC T	84	54	Cancel Superscript/Subscript Mode	9-30
ESC U	85	55	Turn Unidirectional Mode On/Off.	9-10
ESC W	87	57	Turn Double-wide Mode On/Off.	9-27
ESC Y	89	59	Select High-speed Double-density Graphics Mode.	9-38
ESC Z	90	5A	Select Quadruple-density Graphics Mode.	9-39
ESC \	92	5C	Set Relative Print Position	9-21
ESC a	97	61	Select Justification	9-33
ESC b	98	62	Set Vertical Tabs in Channels. ..	9-18
ESC g	103	67	Select 15 CPI	9-24
ESC k	107	6B	Select Typestyle Family.	9-23
ESC l	108	6C	Set Left Margin.	9-19
ESC p	112	70	Turn Proportional Mode On/Off.	9-25
ESC q	113	71	Select Character Style	9-32
ESC t	116	74	Select Character Table	9-34
ESC w	119	77	Turn Double-high Mode On/Off.	9-28
ESC x	120	78	Select Letter Quality or Draft. ..	9-22

Commands Arranged by Topic

This following section lists and describes all the commands by topic. See the Quick Reference card at the back of this book for a handy list of commands by topic.

Printer Operation

Initialization

ESC @ — Initialize Printer

Format:

ASCII code:	ESC	@
Decimal:	27	64
Hexadecimal:	1B	40

Comments:

Resets the printer mode and clears the current print line preceding the command. See Initialization in Chapter 8.

DC1 — Select Printer

Format:

ASCII code:	DC1
Decimal:	17
Hexadecimal:	11

Comments:

Returns the printer to the selected state if it has been deselected by the printer deselect code (DC3). It does not select the printer if it has been switched off line by the ON LINE button.

DC1 and DC3 do not work if pin 36 on the parallel interface is low (for example, on IBM PC and compatible computers).

DC3 — Deselect Printer

Format:

ASCII code: DC3
Decimal: 19
Hexadecimal: 13

Comments:

Puts the printer into the deselected state until the select printer code (DC1) is received. The printer cannot be reselected with the ON LINE button.

DEL — Delete Character

Format:

ASCII code: DEL
Decimal: 127
Hexadecimal: 7F

Comments:

Removes the last text character on the print line but does not affect control codes.

Printing direction

ESC < — Select Unidirectional Mode (one line)

Format:

ASCII code:	ESC	
Decimal:	27	60
Hexadecimal:	1B	3C

Comments:

Printing is normally bidirectional. This command selects unidirectional printing for one line only. (It is cancelled by a carriage return.) The print head moves to the extreme left (home) position and printing takes place from left to right.

ESC U — Turn Unidirectional Mode On/Off

Format:

ASCII code:	ESC	U	n
Decimal:	27	85	n
Hexadecimal:	1B	55	n

Comments:

The following values can be used for n:
1: Turns the mode on
0: Turns the mode off

Printing is normally bidirectional. This command selects unidirectional printing for more accurate positioning.

ESC EM — Control Cut Sheet Feeder

Format:

ASCII code:	ESC	EM	n
Decimal:	27	25	n
Hexadecimal:	1B	19	n

Comments:

The following values can be used for n:
0: Turns mode off
1: Selects bin 1
2: Selects bin 2
4: Turns mode on
R: Ejects a sheet. (No paper is loaded.)

The command should not be used unless the cut sheet feeder is installed. It is ignored if any value other than 0, 1, 2, 4, or R is used for n.

The cut sheet feeder mode can also be turned on and off by setting DIP switch 1-8.

MSB Control

MSB means the Most Significant Bit. MSB control (ESC =, ESC >, and ESC #) does not work for graphics or user-defined characters.

ESC = — Set MSB to 0

Format:

ASCII code:	ESC	
Decimal:	27	61
Hexadecimal	1B	3D

Comments:

Sets the MSB of all incoming data to 0. Some computers always send data with the MSB set to 1, which means that italics or character graphics are always printed. ESC = can overcome this problem.

ESC > — Set MSB to 1

Format:

ASCII code:	ESC	
Decimal:	27	62
Hexadecimal:	1B	3E

Comments:

Sets the MSB bit of all incoming data as 1.

ESC # — Cancel MSB Control

Format:

ASCII code:	ESC	#
Decimal:	27	35
Hexadecimal:	1B	23

Comments:

Cancels the MSB control set by ESC = or ESC >.

BEL — Beeper

Format:

ASCII code: BEL
Decimal: 7
Hexadecimal: 07

Comments:

Sounds the printer's beeper.

Data Control

CR — Carriage Return

Format:

ASCII code: CR
Decimal: 13
Hexadecimal: OD

Comments:

Prints the data in the print buffer and returns the print position to the left margin. A line feed is added if the $\overline{\text{AUTO FEED XT}}$ line on the parallel interface is held LOW or if DIP switch 2-8 is on.

CAN — Cancel Line

Format:

ASCII code: CAN
Decimal: 24
Hexadecimal: 18

Comments:

Clears all text on the print line, but does not affect control codes.

Vertical Motion

Form feeding

FF — Form Feed

Format:

ASCII code:	FF
Decimal:	12
Hexadecimal:	OC

Comments:

Prints the data in the print buffer and advances the paper to the top of the next form according to the current page length. The default page length is 66 lines; you can change the page length with ESC C. When using a cut sheet feeder, FF ejects the sheet into the stacker but does not load a new sheet.

ESC C — Set Page Length in Lines

Format:

ASCII code:	ESC	C	n
Decimal:	27	67	n
Hexadecimal:	1B	43	n

Comments:

Sets the page length to n lines in the current line spacing. The value of n must be from 1 to 127 lines. The top of form position is reset to the current line.

Overrides the DIP switch page length setting.

ESCCO — Set Page Length in Inches

Format:

ASCII code:	ESC	C	0	n
Decimal:	27	67	0	n
Hexadecimal:	1B	43	00	n

Comments:

Sets the page length to n inches. The value of n must be from 1 to 22. The top of form position is reset to the current line.

Overrides the DIP switch page length setting.

ESC N — Set Skip Over Perforation

Format:

ASCII code:	ESC	N	n
Decimal:	27	78	***n***
Hexadecimal:	1B	4E	n

Comments:

The variable n is the number of lines skipped between the last line printed on one page and the first line to print on the next page. For example, with the standard setting for line spacing (1/6-inch), and page length (66 lines), ESC N 6 prints 60 lines and then skips 6. This setting is cancelled by ESC O, ESC C, or ESC C 0. The value of n must be from 1 to 127.

Overrides the DIP switch setting for 1-inch skip over perforation.

ESC O — Cancel Skip Over Perforation

Format:

ASCII code:	ESC	O
Decimal:	27	79
Hexadecimal:	1B	4F

Comments:

cancels the skip over perforation set by ESC N. Overrides the DIP switch setting for 1-inch skip over perforation.

Line feeding

LF — Line Feed

Format:

ASCII code:	LF		
Decimal:	10		
Hexadecimal:	OA		

Comments:

When this command is received, the data in the print buffer is printed and the paper advances one line in the current line spacing.

ESC + — Set n/360-inch Line Spacing

Format:

ASCII code:	ESC		*n*
Decimal:	27	43	n
Hexadecimal:	1B	2B	*n*

Comments:

Sets line spacing to *n/360* of an inch for subsequent line feed commands. The value of *n* must be from 0 to 255.

ESC 0 — Select l/&inch Line Spacing

Format:

ASCII code:	ESC	0
Decimal:	27	48
Hexadecimal:	1B	30

Comments:

Sets the line spacing to l/8 of an inch for subsequent line feed commands.

ESC 2 — Select 1/6-inch Line Spacing

Format:

ASCII code:	ESC	2
Decimal:	27	50
Hexadecimal:	1B	32

Comments:

Sets the line spacing to 1/6 of an inch for subsequent line feed commands. This line spacing is the default at power on.

ESC 3 — Set n/180-inch Line Spacing

Format:

ASCII code:	ESC	3	n
Decimal:	27	51	*n*
Hexadecimal:	1B	33	*n*

Comments:

Sets the line spacing to *n/180* of an inch for subsequent line feed commands. The value of *n* must be from 0 to 255.

ESC A — Set n/60-inch Line Spacing

Format:

ASCII code:	ESC	A	*n*
Decimal:	27	65	*n*
Hexadecimal:	1B	41	*n*

Comments:

Sets the line spacing to *n/60* of an inch for subsequent line feed commands. The value of *n* must be from 0 to 85.

ESC J — Perform n/180-inch Line Feed

Format:

ASCII code:	ESC	J	*n*
Decimal:	*27*	*74*	*n*
Hexadecimal:	1B	4A	*n*

Comments:

Advances the paper n/180 of an inch. The value of *n* must be from 0 to 255. This command produces an immediate line feed but does not affect subsequent line spacing and does not produce a carriage return.

VT — Tab Vertically

Format:

ASCII code:	VT
Decimal:	11
Hexadecimal:	OB

Comments:

Advances the paper to the next vertical tab position in the channel selected by ESC /. If no channel has been selected, channel 0 is used. If no vertical tabs have been set, the paper advances one line.

ESC B — Set Vertical Tabs

Format:

ASCII code:	ESC	B	*nl*	*n2*	...	*0*
Decimal:	*27*	*66*	*nl*	*n2*	...	*0*
Hexadecimal:	1B	42	n1	n2	...	00

Comments:

Sets up to 16 vertical tabs in the current line spacing. Tab settings are not affected by subsequent changes in line spacing. The tab settings are entered as *nl, n2,* etc.-all from 1 to 225, in ascending order. The 0 value (null) indicates the end of the command. All settings are stored in channel 0 (see ESC b). ESC B 0 clears the tab settings.

ESC b — Set Vertical Tabs in Channels

Format:

ASCII code:	ESC	b	c	*nl*	*n2*	...	*0*
Decimal:	27	*98*	*c*	*nl*	*n2*	...	*0*
Hexadecimal:	1B	62	c	n1	n2	...	00

Comments:

Functions the same as ESC B, except that the variable c selects a channel for the vertical tabs, which must be from 0 to 7.

Therefore, up to eight sets of vertical tabs can be set. The channels are selected by ESC /. To clear the tabs in channel c, use ESC b c 0.

ESC / — Select Vertical Tab Channel

Format:

ASCII code:	ESC	/	c
Decimal:	27	47	c
Hexadecimal:	1B	2F	c

Comments:

This command is used to select the vertical tab channel, with the value of c from 0 to 7. All subsequent VT commands use the channel selected by this command. If no channel has been selected, channel 0 is used.

Horizontal Motion

Margins

ESC I — Set Left Margin

Format:

ASCII code:	ESC	1	*n*
Decimal:	27	108	*n*
Hexadecimal:	1B	6C	*n*

Comments:

Sets the left margin to *n* columns in the current character size. Settings made in the proportional mode are treated as 10 cpi. This command clears previous tab settings and all previous characters in the print line. Use lowercase 1 (as in left), not the numeral one. The minimum space between the margins is the width of one double-wide 10 cpi character.

ESC Q — Set Right Margin

Format:

ASCII code:	ESC	Q	*n*
Decimal:	27	81	n
Hexadecimal:	1B	51	*n*

Comments:

Sets the right margin to *n* columns in the current character size. Settings made in the proportional mode are treated as 10 cpi. This command clears previous tab settings and all previous characters in the print line. The minimum space between the margins is the width of one double-wide 10 cpi character.

BS — Backspace

Format:

ASCII code:	BS
Decimal:	*8*
Hexadecimal:	08

Comments:

Prints out data in the print buffer, then moves the print position one space to the left. Backspacing is possible up to, but not beyond, the left margin setting. The BS code is ignored if ESC a2 or ESC a3 has been sent.

ESC $ — Set Absolute Print Position

Format:

ASCII code:	ESC	$	*nl*	*n2*
Decimal:	*27*	*36*	*nl*	*n2*
Hexadecimal:	1B	24	*nl*	*n2*

Comments:

This sequence specifies the distance from the current left margin that subsequent characters are to be printed, using this formula: total number of dots = *nl* + (*n2* x 256). Each unit equals 1/60th of an inch. The sequence is ignored and the previous setting remains effective if the position specified is beyond the right margin.

ESC \ Set Relative Print Position

Format:

ASCII code:	*ESC*	\	*nl*	*n2*
Decimal:	*27*	*92*	*nl*	*n2*
Hexadecimal:	1B	5C	*nl*	*n2*

Comments:

Determines the position (relative to the current position) at which printing of subsequent data will start. To find *nl* and *n2,* first calculate the displacement required in dots. If the displacement is to the left, subtract it from 65536. Send the resulting number using this formula: total number of dots = *nl + (256 x n2).* The command is ignored if it would move the print position outside the current margins. A unit is 1/120th of an inch in draft, and 1/18Oth of an inch in Letter Quality or proportional modes.

Horizontal tabbing

HT Tab Horizontally

Format:

ASCII code:	HT
Decimal:	9
Hexadecimal:	09

Comments:

Advances the print position to the next horizontal tab setting. The default tabs are at 8-character intervals in the currently set pitch. Tab positions are not affected by subsequent changes in cpi.

ESC D — Set Horizontal Tabs

Format:

ASCII code:	ESC	D	*nl*	*n2*	...	*0*
Decimal:	27	68	*nl*	*n2*	...	*0*
Hexadecimal:	1B	44	*nl*	*n2*	...	*00*

Comments:

This command allows setting of up to 32 horizontal tabs, which are entered as *nl, n2,* n3, etc., (from 1 to 255) with the number 0 character terminating the command. The tab settings must be entered in ascending order. ESC D 0 clears all tabs. The default settings, when power is turned on or after an ESC @ command, are at every eight characters. The tab settings are not affected by changes in cpi. The tab positions in proportional printing are determined by the 10 cpi character size.

Overall Printing Style

ESC x — Select Letter Quality or Draft

Format:

ASCII code:	ESC		*n*
Decimal:	27	120	*n*
Hexadecimal:	1B	78	*n*

Comments:

The following values can be used for *n:*

0: Selects draft mode.

1: Selects Letter Quality (LQ) mode.

Overrides the SelecType panel setting.

ESC k — Select Typestyle Family

Format:

ASCII code:	ESC	k	*n*
Decimal:	27	107	*n*
Hexadecimal:	1B	6B	*n*

Comments:

This command affects only the Letter Quality typestyle, not draft. If *n* = 0, the Roman typestyle in the printer is used. To select one of the other typestyles, use the family number of the font as shown below. For example, to choose the Prestige font, use 3 for the value of *n*. The following values can be used for *n:*

0: Roman	5: OCR-B
1: Sans Serif	6: OCR-A
2: Courier	7: Orator
3: Prestige	8: Orator-S
4: Script	

Overrides the SelecType panel setting.

ESC ! — Master Select

Format:

ASCII code:	ESC	!	*n*
Decimal:	27	33	*n*
Hexadecimal:	1B	21	*n*

Comments:

Selects any valid combination of the following modes: 10 cpi, 12 cpi, proportional, condensed, emphasized, double-strike, double-wide, italic, and underline. For details on how to set *n, see* Selecting Typestyles With Master Select in Chapter 4.

Print Size and Character Width

ESC P — Select 10 CPI

Format:

ASCII code:	ESC	P
Decimal:	27	80
Hexadecimal:	1B	50

Comments:

Selects 10 character per inch printing. This command is normally used to cancel 12 or 15 cpi.

ESC M — Select 12 CPI

Format:

ASCII code:	ESC	M
Decimal:	27	77
Hexadecimal:	1B	4D

Comments:

Selects 12 character per inch printing.

ESC g — Select 15 CPI

Format:

ASCII code:	ESC	g
Decimal:	27	103
Hexadecimal:	1B	67

Comments:

Selects 15 character per inch printing, and cancels 10 or 12 cpi. Cannot be combined with condensed mode.

ESC p — Turn Proportional Mode On/Off

Format:

ASCII code:	ESC		*n*
Decimal:	27	112	*n*
Hexadecimal:	1B	70	*n*

Comments:

Turns proportional mode on and off.
The following values can be used for n:
1: Turns mode on.
0: Turns mode off.

The width of proportional characters varies from character to character. Therefore, a narrow letter like i receives less space than a wide letter like W. Proportional character widths are given in the Appendix. This command overrides the condensed mode and fixed cpi fonts. When proportional is cancelled, the previously selected font is used. Graphic characters are printed in fixed cpi only; proportional mode is only available in Roman and Sans Serif fonts.

SI — Select Condensed Mode

Format:

ASCII code:	SI
Decimal:	15
Hexadecimal:	OF

Comments:

Prints characters at about 60 percent of their normal width. For example, the condensed 10 cpi mode has 17 characters per inch. Proportional characters override the condensed mode. Condensed mode cannot be combined with 15 cpi. Condensed can also be turned on and off by SelecType or the ESC SI command.

ESC SI — Select Condensed Mode

Format:

ASCII code:	ESC	SI
Decimal:	27	15
Hexadecimal:	1B	OF

Comments:

Duplicates the SI command and the function of the CONDENSED button on the control panel.

DC2 — Cancel Condensed Mode

Format:

ASCII code:	DC2
Decimal:	18
Hexadecimal:	12

Comments:

Cancels condensed mode set by SI, ESC SI, or SelecType and returns printing to normal.

SO — Select Double-wide Mode (one line)

Format:

ASCII code:	s o
Decimal:	14
Hexadecimal:	OE

Comments:

Doubles the width of all characters on one line. This mode is cancelled by LF, FF, VT, or DC4.

ESC SO — Select Double-wide Mode (one line)

Format:

ASCII code:	ESC	SO
Decimal:	27	14
Hexadecimal:	1B	OE

Comments:

Duplicates the SO command.

ESC W — Turn Double-wide Mode On/Off

Format:

ASCII code:	ESC	W	*n*
Decimal:	27	87	*n*
Hexadecimal:	1B	57	*n*

Comments:

Doubles the width of all characters.

The following values can be used for *n:*

1: Turns mode on.

0: Turns mode off.

DC4 — Cancel Double-wide Mode (one line)

Format:

ASCII code:	DC4
Decimal:	20
Hexadecimal:	**14**

Comments:

Cancels double-wide mode selected by SO or ESC SO, but not double-wide mode selected by ESC W or ESC !.

ESC w — Turn Double-high Mode On/Off

Format:

ASCII code:	ESC		n
Decimal:	27	119	n
Hexadecimal:	1B	77	n

Comments:

Doubles the height of all characters.
The following values can be used for n:
1: Turns mode on.
0: Turns mode off.

You may need to adjust line spacing to compensate for the height of these characters.

Cannot be used with the pull tractor.

Print Enhancement

ESC E — Select Emphasized Mode

Format:

ASCII code:	ESC	E
Decimal:	27	69
Hexadecimal:	1B	45

Comments:

Makes text bolder by printing each dot twice, with the second dot printed slightly to the right of the first.

ESC F — Cancel Emphasized Mode

Format:

ASCII code:	ESC	F
Decimal:	27	70
Hexadecimal:	1B	46

Comments:

Cancels the emphasized mode selected by ESC E.

ESC G — Select Double-strike Mode

Format:

ASCII code:	ESC	G
Decimal:	27	71
Hexadecimal:	1B	47

Comments:

Makes text bolder by printing each line twice.

ESC H — Cancel Double-strike Mode

Format:

ASCII code:	ESC	H
Decimal:	27	72
Hexadecimal:	1B	48

Comments:

Cancels the double-strike mode selected by ESC G.

ESC S 0 — Select Superscript Mode

Format:

ASCII code:	ESC	S	0
Decimal:	27	83	0
Hexadecimal:	1B	53	00

Comments:

Prints characters about two-thirds of the normal character height in the upper part of the character space.

ESC S l — Select Subscript Mode

Format:

ASCII code:	ESC	S	1
Decimal:	27	83	1
Hexadecimal:	1B	53	01

Comments:

Prints characters about two-thirds of the normal character height in the lower part of the character space.

ESC T — Cancel Superscript/Subscript Mode

Format:

ASCII code:	ESC	T
Decimal:	27	84
Hexadecimal:	1B	54

Comments:

Cancels either superscript or subscript.

Format:

ASCII code:	ESC	(	-	nl	*n2*	*m*	*dl*	*d2*
Decimal:	27	40	45	nl	n2	*m*	*dl*	*d2*
Hexadecimal:	1B	28	2D	*nl*	*n2*	*m*	*dl*	*d2*

Comments:

Use decimal or hexadecimal values for all variables, not ASCII characters.

Use the following values for the first 3 variables:
nl must be 3.
n2 must be 0.
m must be l.

The value of *dl* determines the location of the score:
dl = 1 for underline.
dl = 2 for strike-through.
dl = 3 for overscore.

The value of *d2* determines whether the score line is single, double, broken, or continuous:
d2 = 0 Cancel the score line selected by *dl.*
d2 = 1 Single continuous line.
d2 = 2 Double continuous line.
d2 = 5 Single broken line.
d2 = 6 Double broken line.

The last three bits of *d2* determine the characteristics of the score line as shown below:

	Bit 2	**Bit 1**	**Bit 0**
On (1)	Broken line	Double line on	Single line on
Off (0)	Continuous line	Double line off	Single line off

Note: If bit 1 and bit 0 are both off, the selected score is canceled. Double line and single line scores cannot be combined at the same score position.

ESC - Turn Underline Mode On/Off

Format:

ASCII code:	ESC	-	*n*
Decimal:	27	45	*n*
Hexadecimal:	1B	2D	*n*

Comments:

This mode provides continuous underlining including spaces.

The following values can be used for *n:*

1: Turns mode on.

0: Turns mode off.

Areas skipped with HT or ESC $ are not underlined.

ESC q Select Character Style

Format:

ASCII code:	ESC		*n*
Decimal:	27	113	*n*
Hexadecimal:	1B	71	n

Comments:

The following values can be used for *n:*

0: Selects normal.

1: Selects outline.

2: Selects shadow.

3: Selects outline with shadow.

This command is valid for all characters, with the exception of character codes B0H to DFH, F4H, and F5H (176 to 223, 244, and 245 decimal) in the Epson Extended Graphics character table.

Word Processing

ESC a — Select Justification

Format:

ASCII code:	ESC		*n*
Decimal:	27	97	n
Hexadecimal:	1B	61	*n*

Comments:

Sets the type of justification.
The following values can be used for *n:*
0: Selects left justification.
1: Selects centering.
2: Selects right justification.
3: Selects full justification.

The default setting is *n* = 0. Full justification *(n* = 3) is performed when the buffer becomes full; HT, BS, and spacing commands should not be used with justification. For *n* = 3 there must be no carriage returns within a paragraph.

ESC SP (space) — Set Intercharacter Space

Format:

ASCII code:	ESC	SP	*n*
Decimal:	27	32	*n*
Hexadecimal:	1B	20	*n*

Comments:

Sets the amount of space added to the right of each character, in addition to the space already allowed in the design of the character. The number of dots is determined by *n,* which should be from 0 to 127. Each unit of space is 1/120th of an inch in draft mode and 1/180th of an inch in Letter Quality and proportional modes. Double-wide mode doubles the unit of space.

ESC t — Select Character Set

Format:

ASCII code:	ESC	t	n
Decimal:	27	116	n
Hexadecimal:	1B	74	n

Comments:

Selects the character table used by codes 128 to 225. Selecting a graphics character set does not disable italic printing. Italic printing can still be selected by ESC 4. The following values can be used for n:

0: Selects italics character table.
1: Selects a graphics character set.
2: Selects the user-defined character table and remaps user-defined 0-127 to 128-255.

Note that the value of n must equal 100 hex, 01 hex, or 02 hex. See the Appendix for character sets.

ESC 4 — Select Italic Mode

Format:

ASCII code:	ESC	4
Decimal:	27	52
Hexadecimal:	1B	34

Comments:

Causes characters from the italic character table to be printed. This command is valid even if a graphics character set has been selected by ESC t or by DIP switches, but the character graphics are not italicized.

ESC 5 — Cancel Italic Mode

Format:

ASCII code:	ESC	5
Decimal:	27	53
Hexadecimal:	1B	35

Comments:

Cancels the mode selected by ESC 4.

ESC R — Select an International Character Set

Format:

ASCII code:	ESC	R	*n*
Decimal:	27	82	n
Hexadecimal:	1B	52	*n*

Comments:

Selects one of the international character sets.

The following values can be used for *n:*

0 = USA	8 = Japan
1 = France	9 = Norway
2 = Germany	10 = Denmark II
3 = England	11 = Spain II
4 = Denmark I	12 = Latin America
5 = Sweden	13 = Korea
6 = Italy	64 = Legal
7=SpainI	

Overrides the DIP switch settings of the international character set.

User-defined Characters

See Chapter 4 for sample programs and full information on this topic.

ESC & — Define User-defined Characters

Format:

ASCII code:	ESC	&	0	*d l*	*d2...dn*
Decimal:	27	38	*0*	*dl*	*d2...dn*
Hexadecimal:	1B	26	*00*	*dl*	*d2...dn*

Comments:

This command allows characters to be redefined in the currently selected mode.

ESC : — Copy ROM to RAM

Format:

ASCII code:	ESC	:	0	*n*	*0*
Decimal:	27	58	*0*	*n*	*0*
Hexadecimal:	1B	3A	00	*n*	00

Comments:

This sequence copies the characters in ROM to RAM so that specific characters can be redefined. The variable *n* represents the font family.

0: Roman
1: Sans Serif
2: Courier
3: Prestige
4: Script
5: OCR-B
6: OCR-A

ESC % — Select User-defined Set

Format:

ASCII code:	ESC	%	*n*
Decimal:	27	37	*n*
Hexadecimal:	1B	25	*n*

Comments:

This sequence is used to print the user-defined (download) character set. ESC & is required to define the character set. The following values can be used for *n:*

0: Selects the normal set.

1: Selects the user-defined set.

ESC 6 — Enable Printable Characters

Format:

ASCII code:	ESC	6
Decimal:	27	54
Hexadecimal:	1B	36

Comments:

When a graphics character set is selected, ESC 6 enables the printing of codes 128 through 159 (decimal) as characters, not control codes. See the Appendix for characters printed.

ESC 7 — Enable Upper Control Codes

Format:

ASCII code:	ESC	7
Decimal:	27	55
Hexadecimal:	1B	37

Comments:

When a graphics character set is selected, ESC 7 causes codes 128 through 159 to be treated as control codes. This is the default.

Graphics

See Chapter 4 for sample graphics programs. See the table under ESC * for graphics modes.

ESC K — Select Single-density Graphics Mode

Format:

ASCII code:	ESC	K	*nl*	*n2*
Decimal:	*27*	*75*	*nl*	*n2*
Hexadecimal:	1B	4B	*nl*	*n2*

Comments:

Turns on 8-pin, single-density graphics mode. The total number of columns = *nl + (n2 x 256).*

ESC L — Select Double-density Graphics Mode

Format:

ASCII code:	ESC	L	nl	*n 2*
Decimal:	*27*	*76*	*nl*	*n2*
Hexadecimal:	1B	4C	*nl*	*n2*

Comments:

Turns on 8-pin, low-speed, double-density graphics mode. The total number of columns = *nl + (n2 x 256).*

ESC Y — Select High-speed Double-density Graphics Mode

Format:

ASCII code:	ESC	Y	*nl*	*n2*
Decimal:	*27*	*89*	*nl*	*n2*
Hexadecimal:	1B	59	*nl*	*n2*

Comments:

Turns on 8-pin, high-speed, double-density graphics mode. The total number of columns = *nl + (n2 x 256).*

ESC *Z* — Select Quadruple-density Graphics Mode

Format:

ASCII code:	ESC	Z	*nl*	*n2*
Decimal:	27	90	*nl*	*n2*
Hexadecimal:	1B	5A	*nl*	*n2*

Comments:

Turns on S-pin, quadruple-density graphics mode. The total number of columns = *nl + (n2 x 256).*

ESC * — Select Graphics Mode

Format:

ASCII code:	ESC	*	*m*	*nl*	*n2*
Decimal:	27	42	*m*	*nl*	*n2*
Hexadecimal:	1B	2A	*m*	*nl*	*122*

Comments:

Turns on graphics mode *m. See* the following table for details on the available modes. The total number of columns = *nl + (n2 x 256).*

Option	Pins	m	Horiz. density (dots/in)
Single-density	8	0	60
Double-density	8	1	120
High-speed double-density'	8	2	120
Quadruple-density*	8	3	240
CRT I	8	4	80
CRT II	8	6	90
Single-density	24	32	60
Doubledensity	24	33	120
CRT III	24	38	90
Triple-density	24	39	180
Hex-density'	24	40	360

• Adjacent dots cannot be printed in this mode.

Format:

ASCII code:	ESC	?	s	*m*
Decimal:	27	63	*s*	*m*
Hexadecimal:	1B	3F	s	*m*

Comments:

Changes from one graphics mode to another. The variable s is a character (K, L, Y or Z).

The variable *m* corresponds to the mode *m* in the ESC * command.

Appendix

Proportional Width Table A-2

Character Sets A-6

Proportional Width Table

This table lists the widths of your printer's proportional characters. The values given are in 360ths of an inch. (For example, a value of 36 is 36/360ths of an inch.) You may need to enter these widths into a special table for your processing program so it can calculate the number of proportional characters that will fit on a line.

The characters with no code indicated are international characters or graphics. See the table in Chapter 3 for the relevant codes for the international characters. Also, see the descriptions of the ESC R and ESC t commands in Chapter 9 for information on how to use these characters.

The following width table shows each character, its ASCII code (hexadecimal), and its width. If there are two numbers in the width column, the second one is for the superscript/subscript version of the character.

Code	CHR	Width
20	!	30/20
21	"	18/12,
22	#	30/20
23	$	30/20
24	%	30/20
25	&	36/24
26	'	36/24
27	(	18/12
28	)	24/16
29	*	24/16
2A	+	30/20
28	,	30/20
2C	–	18/12
2D	.	30/20
2E	/	18/12
2F		30/20

Code	CHR	Width
30	0	30/20
31	1	30/20
32	2	30/20
33	3	30/20
34	4	30/20
35	5	30/20
36	6	30/20
37	7	30/20
38	8	30/20
39	9	30/20
3A	:	18/12
3B	·	18/12
3C	<	30/20
3D	=	30/20
3E	>	30/20
3F	?	30/20

Code	CHR	Width
40	@	36/24
41	A	36/24
42	B	36/24
43	C	36/24
44	D	36/24
45	E	36/24
46	F	36/24
47	G	36/24
48	H	36/24
49	I	24/16
4A	J	30/20
4B	K	36/24
4C	L	36/24
4D	M	42/28
4E	N	36/24
4F	O	36/24
50	P	*36/24*
51	Q	*36/24*
52	R	*36/24*
53	S	36/24
54	T	*36/24*
55	U	42/28
56	V	*36/24*
57	W	42/28
58	X	*36/24*
59	Y	*36/24*
5A	Z	*30/20*
5B	[	24/16
5C	\	*30/20*
5D	]	*24/16*
5E	^	*30/20*
5F	_	*30/20*
60	`	18/12
61	a	*30/20*
62	b	*36/24*
63	c	*30/20*

Code	CHR	Width
64	d	*36/24*
65	e	*30/20*
66	f	*24/16*
67	g	36/24
68	h	*36/24*
69	i	18/12
6A	j	24/16
6B	k	*36/24*
6C	l	18/12
6D	m	42/28
6E	n	*36/24*
6F	o	*30/20*
70	p	*36/24*
71	q	*36/24*
72	r	*30/20*
73	s	*30/20*
74	t	*24/16*
75	u	*36/24*
76	v	*36/24*
77	w	42/28
78	x	*30/20*
79	y	*36/24*
7A	z	*30/20*
7B	{	24/16
7C	¦	18/12
7D	}	24/16
7E	~	*30/20*
	Ç	*36/24*
	ü	*36/24*
	é	*30/20*
	â	*30/20*
	ä	*30/20*
	à	*30/20*
	å	*30/20*
	ç	*30/20*
	ê	*30/20*

Code	CHR	Width	Code	CHR	Width
	ë	30/20		«	30/20
	è	30/20		»	3O/20
	ï	18/12	B0		30
	î	18/12	B1		30
	ì	18/12	B2		30
	Ä	36/24	B3		30
	Å	36/24	B4		30
	É	36/24	B5		30
	æ	42/28	B6		30
	Æ	42/28	B7		30
	ô	30/20	B8		30
	ö	30/20	B9		30
	ò	30/20	BA		30
	û	36/24	BB		30
	ù	36/24	BC		30
	ÿ	36/24	BD		30
	Ö	36/24	BE		30
	Ü	42/28	BF		30
	¢	30/20	co		30
	£	30/20	CI		30
	¥	36/24	C2		30
	₧	42/28	C3		30
	ƒ	30/20	C4		30
	á	30/20	C5		30
	í	18/12	C6		30
	ó	30/20	C7		30
	ú	36/24	C8		30
	ñ	36/24	C9		30
	Ñ	36/24	CA		30
	ª	30/20	CB		30
	º	30/20	CC		30
	¿	30/20	CD		30
	⌐	30/20	CE		30
	¬	30/20	CF		30
	½	30/20	D0		30
	¼	30/20	D1		30
	¡	30/20	D2		30

	CHR	Width
D3		30
D4		30
D5		30
D6		30
D7		30
D8		30
D9		30
DA		30
DB		30
DC		30
DD		30
DE		30
DF		30
E0	α	*30/20*
EI	ß	30/20
E2	Γ	*30/20*
E3	π	*30/20*
E4	Σ	*30/20*
E5	σ	*30/20*
E6	µ	*30/20*
E7	τ	*30/20*
Ea	Φ	*30/20*
E9	Θ	*30/20*
EA	Ω	*30/20*
EB	δ	*30/20*
EC	∞	30/20
ED	ø	*30/20*
EE	∈	*30/20*
EF	∩	*30/20*
F0	≡	30
FI	±	30
F2	≥	30
F3	≤	30
		30
f5		30
F6	÷	30
F7	≈	30

	CHR	
F8		**30**
F9		**30**
FA		**30**
FB		**30**
FC		30
FD		30
FE		**30**
		24/16
	¤	30/20
	ß	36l24
	Ø	36l24
	ø	30/20
	¨	30/20
	§	30/20
	₩	42/28
	'	18/12
	"	30/20
	¶	30/20
	●	36/24
	●	36/24
	†	30/20
	■	36/24

Character Sets

The italics character set or a graphics character set is selected by DIP switch 1-4 or the ESC t software command.

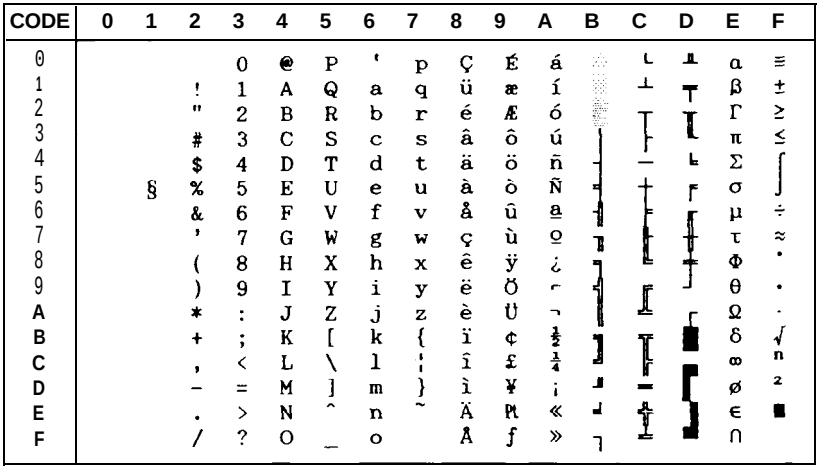
The graphics character sets are selected by DIP switches 1-1, 1-2, and 1-3 when DIP switch 1-4 is on. For the graphics character sets, the ESC 6 or ESC 7 software command lets you select whether to print hex codes 80 to 9F as characters (ESC 6) or control codes (ESC 7).

Italic Character Table

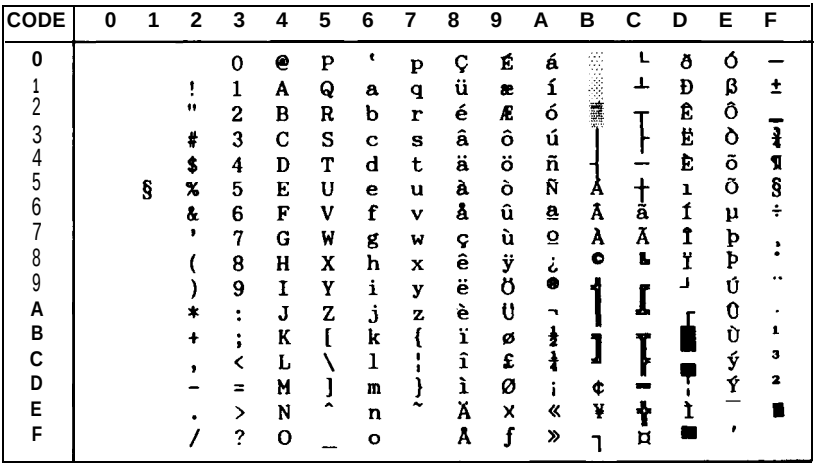
CODE	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0				O	@	P	'	p				O	@	P	'	P
1			!	l	A	Q	a	q			!	l	A	Q	a	q
2			"	2	B	R	b	r			"	2	B	R	b	r
3			#	3	C	S	c	s			#	3	C	S	C	S
4			%	4	D	T	d	t			$	4	D	T	d	t
5			%	S	E	U	e	u			%	S	E	U	e	u
6			&	G	F	V	f	v			&	G	F	V	f	V
7			'	7	G	W	g	w			'	7	G	W	g	w
a			(	8	H	X	h	x			(	8	H	X	h	x
9			)	9	I	Y	i	y			)	9	I	Y	i	y
A			*	:	J	Z	j	z			*	:	J	2		jz
B			+	;	K	1	k	(			+	;	K	t		ki
C			¶	<	L	\		1			ƒ	<	L	\	l	/
D			-	=	M	l	m	)			-	=	M	l	m	)
E				>	N	"	n	'				>	N	^		n
F			;	?	O	-	0				;	?	o	-	o	

Graphics Character Sets

PC 437 (United Stafes)-Epson Extended Graphics



PC 850 (Multilingual)



PC 860 (Portugal)

CODE	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0				0	@	P	'	p	Ç	É	á	▒	└	╨	α	≡
1			!	1	A	Q	a	q	ü	À	í		┴	╤	ß	±
2			"	2	B	R	b	r	é	È	ó		┬	╥	Γ	≥
3			#	3	C	S	c	s	â	ô	ú		├	╙	π	≤
4			$	4	D	T	d	t	ã	õ	ñ		─	╘	Σ	⌠
5		§	%	5	E	U	e	u	à	ò	Ñ		┼	╒	σ	⌡
6			&	6	F	V	f	v	Á	Ú	ª		╞	╓	µ	÷
7			'	7	G	W	g	w	ç	ù	º		╟	╫	τ	≈
8			(	8	H	X	h	x	ê	Ì	¿		╚	╪	Φ	°
9			)	9	I	Y	i	y	Ê	Õ	Ò		╔	┘	θ	∙
A			*	:	J	Z	j	z	è	Ü	¬		╩	┌	Ω	·
B			+	;	K	[	k	{	í	¢	½		╦	█	δ	√
C			,	<	L	\	l	¦	Ô	£	¼		╠	▄	∞	n
D			-	=	M	]	m	}	ì	Ù	¡		═	▌	ø	2
E			.	>	N	^	n	~	Ã	₧	«		╬	▐	∈	■
F			/	?	O	_	o		Â	Ó	»		╧	▀	∩	

PC 863 (Canada-French)

CODE	0	1	2	3	4	5	6	7	6	9	A	B	C	D	E	F
0				0	@	P	'	p	Ç	É	¦	▒	└	╨	α	≡
1			!	1	A	Q	a	q	ü	È	'		┴	╤	ß	±
2			"	2	B	R	b	r	é	Ê	ó		┬	╥	Γ	≥
3			#	3	C	S	c	s	â	ô	ú		├	╙	π	≤
4			$	4	D	T	d	t	À	Ë	¨		─	╘	Σ	⌠
5		§	%	5	E	U	e	u	à	Ï	.		┼	╒	σ	⌡
6			&	6	F	V	f	v	¶	û	³		╞	╓	µ	÷
7			'	7	G	W	g	w	ç	ù	—		╟	╫	τ	≈
6			(	8	H	X	h	x	ê	¤	¹		╚	╪	Φ	°
9			)	9	I	Y	i	y	ë	Ô	⌐		╔	┘	θ	∙
A			*	:	J	Z	j	z	è	Ü	¬		╩	┌	Ω	·
0			+	;	K	[	k	{	ï	¢	½		╦	▄	δ	√
C			,	<	L	\	l	¦	î	£	¼		╠	▌	∞	n
D			-	=	M	]	m	}	‗	Ù	¾		═	▀	ø	2
E			.	>	N	^	n	~	À	Û	«		╬	▐	∈	■
F			/	?	O	_	o		§	ƒ	»		╧	▀	∩	

PC 865 ***(Norway)***

CODE	0	1	2	3	4	5	6	7	6	9	A	B	C	D	E	F
0				0	@	P	'	p	Ç	É	á		└	╨	α	≡
1			!	1	A	Q	a	q	ü	æ	í		┴	╤	ß	±
2			"	2	B	R	b	r	é	Æ	ó		┬	╥	Γ	≥
3			#	3	C	S	c	s	â	ô	ú		├	╙	π	≤
4			$	4	D	T	d	t	ä	ö	ñ		─	╘	Σ	⌠
5		§	%	5	E	U	e	u	à	ò	Ñ		┼	╒	σ	⌡
6			&	6	F	V	f	v	å	û	ª		╞	╓	µ	÷
7			'	7	G	W	g	w	ç	ù	º		╟	╫	τ	≈
6			(	8	H	X	h	x	ê	ÿ	¿		╚	╪	Φ	°
9			)	9	I	Y	i	y	ë	Ö	⌐		╔	┘	θ	∙
A			*	:	J	Z	j	z	è	Ü	¬		╩	┌	Ω	·
B			+	;	K	[	k	{	ï	ø	½		╦	█	δ	√
C			,	<	L	\	l	¦	î	£	¼		╠	▄	∞	n
D			-	=	M	]	m	}	ì	Ø	¡		═	▌	ø	2
E			.	>	N	^	n	~	Ä	₧	«		╬	▐	ϵ	■
F			/	?	O	_	o		Å	ƒ	»		╧	▀	∩	

Glossary

Note that these definitions apply specifically to printers. If a word is italicized, see that topic for more information.

application program
A software program that helps you carry out a particular task, such as word processing or financial planning.

ASCII
Acronym for the American Standard Code for Information Interchange. A standardized coding system for assigning numerical codes to letters and symbols.

auto line feed
When this feature is enabled using a DIP switch or external control through the parallel connector, the printer will automatically feed the paper one line after receiving a CR code.

baud rate
A measure of the speed of data transmission. Usually expressed in bits per second or bps.

bidirectional printing
Printing in which the print head alternates printing a line left to right then the next line right to left, and so on. Because the head prints in both directions, the overall printing speed increases by eliminating wasted (non-printing) movement.

binary
See number systems.

bit
A binary digit (0 or 1), which is the smallest unit of information used by a printer or computer. See also *number systems.*

buffer
See input buffer and memory.

byte
A unit of information consisting of eight bits.

carriage return (CR)
The control code that returns the print position to the left margin. When issued together with a line feed, the print position moves to the left margin of the next line. In bidirectional printing, the print head may not physically move to the left margin.

character set
A collection of letters, numbers, and symbols that provides you with the characters used in a particular language.

characters per inch (cpi)
A measure of the size of text characters, often referred to as pitch. The standard or default setting is usually 10 cpi.

condensed
Printing in which each character is approximately 60 percent of the width of standard characters. For example, condensed 10 characters per inch (cpi) has 17 characters per inch. Useful for fitting wide tables or spreadsheets onto the paper.

continuous paper
Paper which has sprocket-feed holes on both long edges, is perforated between pages, and is supplied in a folded stack. Also called fanfold paper.

control code
In addition to the codes for printable characters, the ASCII standard also includes 33 other codes which are called control codes. These control codes perform such functions as sounding the beeper and performing a carriage return or line feed.

cut sheet feeder (CSF)
An optional, detachable device which automatically feeds single sheets of paper into the printer.

data dump
Sometimes called hex dump. A troubleshooting feature. When the printer is in the data dump mode, each code that it receives is printed in hexadecimal notation.

decimal
See number systems.

default
A value or setting that takes effect when the equipment is turned on, reset, or initialized.

DIP switches
Small switches in a printer that control various printer functions and set the default status of the printer when it is turned on or initialized. DIP stands for Dual In-line Package.

dot graphics
A graphic design formed by patterns of dots. Also called bit image graphics.

dot matrix
A method of printing in which each letter or symbol is formed by a pattern (matrix) of individual dots.

double-high printing
Printing in which each character is twice as tall as normal.

double-strike printing
A way of producing bolder characters. Each character is printed twice. Can be used only in draft mode.

double-wide printing
A print width in which each character is twice as wide as normal characters. (The cpi is halved.)

draft mode
One of three print qualities available on your primer. Draft uses fewer dots per character for high-speed printing. See also Letter *Quality* and *Super-Draft.*

emphasized printing
A way of producing darker characters. In a single pass of the print head, characters receive twice the number of dots.

ESC (escape) code
A special control code used to begin most printer commands.

ESCJP
Abbreviation for Epson Standard Code for Printers. The system of commands lets you perform software control of your primer from your computer. It is standard for all Epson primers and supported by most application software for personal computers.

font
A font is a style of type designated by a family name.

form
In printer terminology, a form normally refers to a page.

form feed
Refers to both a control code and a panel button that advances the paper to the top of the next page.

graphics character sets
The graphics character sets contain international accented characters, Greek characters, and character graphics for printing lines, comers, and shaded areas.

hexadecimal (hex)
See number systems.

initialize
To establish the initial default status of the primer by turning the primer on, or by sending an INIT signal or code (ESC @).

input buffer
The memory in the printer in which data sent from the computer is stored while waiting to be printed.

interface
The means of connection between the computer and printer. See also *parallel interface* and *serial interface.*

italic
A typestyle in which the characters slant. *This sentence is italicized.* Also, a character table that contains italicized characters and symbols.

Letter Quality
One of two print qualities available on your printer. Letter Quality provides better readability and appearance at a reduced print speed. See also *draft* mode and *SuperDraf.*

line feed
Both a control code and a panel button that advances the paper one line space.

loading position
The position to which the paper is automatically loaded. It can be adjusted by using the micro-adjustment feature.

memory
The printer, like a computer, has a memory. When you print a file from a computer, the contents of the file are transferred quickly from the computer's memory to the printer's memory. The printer then prints information from its own memory at a much slower rate. This way of printing frees the computer to do other work while the printer is still working. The printer memory is sometimes called the buffer memory or input buffer.

micro-adjustment
A feature that adjusts the paper loading and short tear-off positions by the smallest possible increments.

number systems
Three number systems are commonly used with printers:

binary is base 2 and uses only the digits 0 and 1. All information in computer systems is handled in binary form represented by electrical signals that are on or off. **A** binary digit is often called a bit; any decimal number between 0 and 255 can be expressed by an eight-bit binary number.

decimal is base 10 and uses the digits 0, 1,2,3,4,5,6,7,8, and 9. (This is the most familiar system.)

hexadecimal (hex) is base 16 and uses the digits 0, 1,2,3,4,5,6,7, 8,9, A, B, C, D, E, and F. This is frequently used by programmers. Any decimal number between 0 and 255 can be expressed by a two-digit hex number.

on line
When the printer is on line, it is able to communicate with the computer connected to it.

paper bail
The part of the printer that holds the paper against the platen.

paper-out sensor
A small switch behind the platen that sends a signal when it is not in contact with paper, informing the printer and remote computer that there is no paper loaded, and causing the PAPER OUT light to go on.

paper tension unit
The part of the printer that fits above the platen to assure proper paper tension in the printing area.

parallel interface
An interface that connects the computer and the printer. A parallel interface transmits data one character or code at a time. See **also** *serial interface.*

Parity
Parity is a method for a computer and primer to check the reliability of data transmission.

platen
The black roller that provides the backing for the paper during printing.

print quality
Your printer has three types of print quality: draft, SuperDraft, and Letter Quality. Draft and SuperDraft are for high-speed, draft quality jobs; Letter Quality is used to produce more polished documents.

proportional printing
Printing in which the character width varies from character to character. For example, a capital W receives much more space than a lowercase i. The result looks more like a typeset book than a typewritten draft.

pull tractor unit
An optional device that feeds continuous paper and multi-part forms through the printer.

push tractor
A built-in device that feeds continuous paper through the printer.

RAM
Acronym for Random Access Memory. The portion of the printer's memory used as a buffer and as a place for storing user-defined characters. All data stored in RAM is lost when the printer is turned off.

reset
To return a primer to its defaults, either by a command, an INlT signal, code, or by turning the printer off and on.

ROM
Acronym for Read Only Memory. The portion of the printer's memory used to store power-on instructions and built-m fonts.

self test
A method of checking the operation of the printer. When the self test is run, the printer prints out its current DIP switch settings and the characters that are stored in its ROM (Read Only Memory).

serial interface
A serial interface transmits data one bit at a time. See also *padel interface.*

short tear-off
A feature that automatically feeds the perforation of continuous paper to the tear-off position for you to remove it, and then draws the paper back to the loading position. These positions can be adjusted using the micro-adjustment feature. See also micro-*adjustment* and *loading position.*

SuperDraft
One of three print qualities available on your printer. SuperDraft uses a minimum number of dots per character for high-speed printing. See also draft mode and Letter *Quality.*

tear-off position
The position the printer feeds the paper to when the auto tear-off mode is on. This position can be adjusted using micro-adjustment so that the paper's perforation meets the printer's tear-off edge.

top of form position
The position on the paper that the printer recognizes as the first printable line.

tractor
The part of the printer that moves continuous paper through the printer by its sprockets gripping the holes in continuous paper.

unidirectional printing
Printing in one direction only. Allows more precise vertical alignment than bidirectional printing. Often used for printing graphics.

user-defined characters
Characters that are defined and stored in the printer by the user. Also known as download characters.

10 cpi
A character spacing of 10 characters per inch. This is often the standard or default pitch.

12 cpi
A character spacing in which each character is slightly narrower than normal, so that there are 12 characters per inch.

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Quick Reference

Commands Arranged by Topic

This section lists all the commands, The numbers in **the columns on the right are the page numbers in Chapter 9 where a complete description of the command can be found.**

Printer Operation

Code	Dec	Hex	Function	Page
ESC @	64	40	Initialize Printer	9-8
DC1	17	11	Select Printer	9-8
DC3	19	13	Deselect Printer	9-9
DEL	127	7F	Delete Character	9-9
ESC <	60	3C	Select Unidirectional Mode (one line)	9-9
ESC U	85	55	Turn Unidirectional Mode On/Off	9-10
ESC EM	25	19	Control Cut Sheet Feeder	9-10

MSB Control

Code	Dec	Hex	Function	Page
ESC =	61	3D	Set MSB to 0	9-11
ESC >	62	3E	Set MSB to 1	9-11
ESC #	35	23	Cancel MSB Control	9-11
BEL	7	07	Beeper	9-12

Data Control

Code	Dee	Hex	Function	Page
CR	13	OD	Carriage Return	9-12
CAN	24	18	Cancel Line	9-12

Vertical Motion

Code	Dec	Hex	Function	Page
FF	12	0C	Form Feed	9-13
ESC C	67	43	Set Page Length in Lines	9-13
ESC C 0	67	43	Set Page Length in Inches	9-14
ESC N	78	4E	Set Skip Over Perforation	9-14
ESC O	79	4F	Cancel Skip Over Perforation	9-14
LF	10	0A	Line Feed	9-15
ESC +	43	2B	Set *n*/360-inch Line Spacing	9-15
ESC 0	48	30	Select 1/8-inch Line Spacing	9-15
ESC 2	50	32	Select 1/6-inch Line Spacing	9-16
ESC 3	51	33	Set *n*/180-inch Line Spacing	9-16
ESC A	65	41	Set *n*/60-inch Line Spacing	9-16
ESC J	74	4A	Perform *n*/180-inch Line Feed	9-17
VT	11	0B	Tab Vertically	9-17
ESC B	66	42	Set Vertical Tabs	9-17
ESC b	98	62	Set Vertical Tabs in Channels	9-18
ESC /	47	2F	Select Vertical Tab Channel	9-18

Horizontal Motion

Code	Dec	Hex	Function	Page
ESC l	108	6C	Set Left Margin	9-19
ESC Q	81	51	Set Right Margin	9-19
BS	8	08	Backspace	9-20
ESC $	36	24	Set Absolute Print Position	9-20
ESC \	92	5C	Set Relative Print Position	9-21
HT	9	09	Tab Horizontally	9-21
ESC D	68	44	Set Horizontal Tabs	9-22

Overall Printing Style

Code	Dee	Hex	Function	Page
ESC x	120	70	Select Letter Quality or Draft	9-22
ESC k	107	6B	Select Typestyle Family	923
ESC	33	21	Master Select	9-23

Print Size and Character Width

Code	Dec	Hex	Function	Page
ESC P	80	50	Select 10 CPI	9-24
ESC M	77	4D	Select 12 CPI	9-24
ESC g	103	67	Select 15 CPI	9-24
ESC p	112	70	Turn Proportional Mode On/Off	9-25
SI	15	0F	Select Condensed Mode	9-25
ESC SI	15	0F	Select Condensed Mode	9-26
DC2	18	12	Cancel Condensed Mode	9-26
SO	14	0E	Select Double-wide Mode (one line)	9-26
ESC SO	14	0E	Select Double-wide Mode (one line)	9-27
ESC W	87	57	Turn Double-wide Mode On/Off	9-27
DC4	20	14	Cancel Double-wide Mode (one line)	9-27
ESC w	119	77	Turn Double-high Mode On/Off	9-28

Print Enhancement

Code	Dec	Hex	Function	Page
ESC E	69	45	Select Emphasized Mode	9-28
ESC F	70	46	Cancel Emphasized Mode	9-28
ESC G	71	47	Select Double-strike Mode	9-29
ESC H	72	48	Cancel Double-strike Mode	9-29
ESC S 0	83	53	Select Superscript Mode	9-29
ESC S 1	83	53	Select Subscript Mode	9-30
ESC T	84	54	Cancel Superscript/Subscript Mode	9-30
ESC (-	40	28	Select Score	9-31
ESC -	45	2D	Turn Underline Mode On/Off	9-32
ESC q	113	71	Select Character Style	9-32

Word Processing

Code	Dec	Hex	Function	Page
ESC a	97	61	Select Justification	9-33
ESC SP{spacel,	32	20	Set Intercharacter Spaca	9-33

Character Tables

cods	Dec	Hex	Function	Page
ESC t	116	74	Select Character Table	434
ESC 4	52	34	Select Italic Mode	434
ESC 5	53	35	Cancel Italic Mode	9-35
ESC R	62	52	Select an International Character Set	9-35

User-defined Characters

Code	Dsc	Hex	Function	Page
ESC &	36	26	Define User-defined Characters	436
ESC :	56	3A	copy ROM to RAM	436
ESC %	37	25	Select User-defined Set	9-37
ESC 6	54	36	Enable Printable Characters	9-37
ESC 7	55	37	Enable Upper Control Codes	9-37

Graphics

Code	Dec	Hex	Function	Page
ESC K	75	4B	Select Single-density Graphics Mode	9-38
ESC L	76	4C	Select Double-density Graphics Mode	9-38
ESC Y	89	59	Select High-speed Double-density Graphics Mode	9-38
ESC Z	90	5A	Select Quadruple-density Graphics Mode	9-39
ESC*	42	2A	Select Graphics Mode	9-39
ESC ?	63	3F	Reassign Graphics Mode	9-40

The DIP Switch Tables

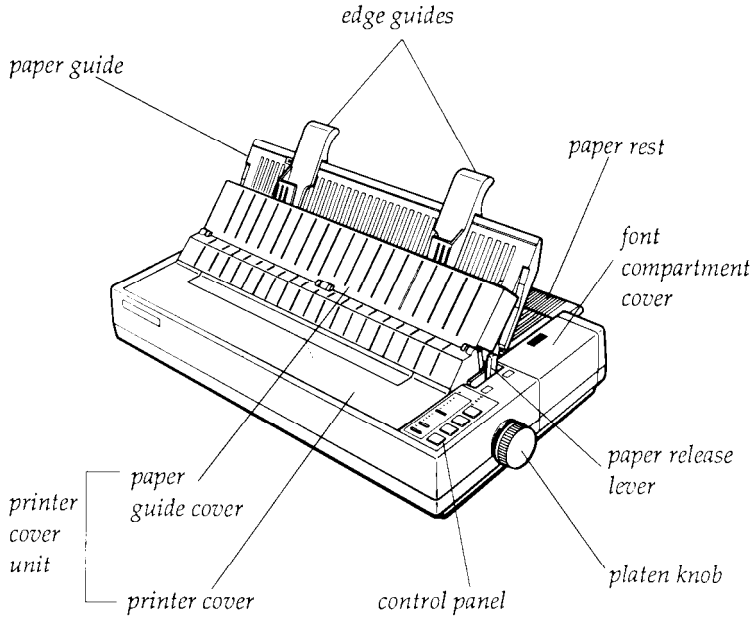
DIP Switch 1

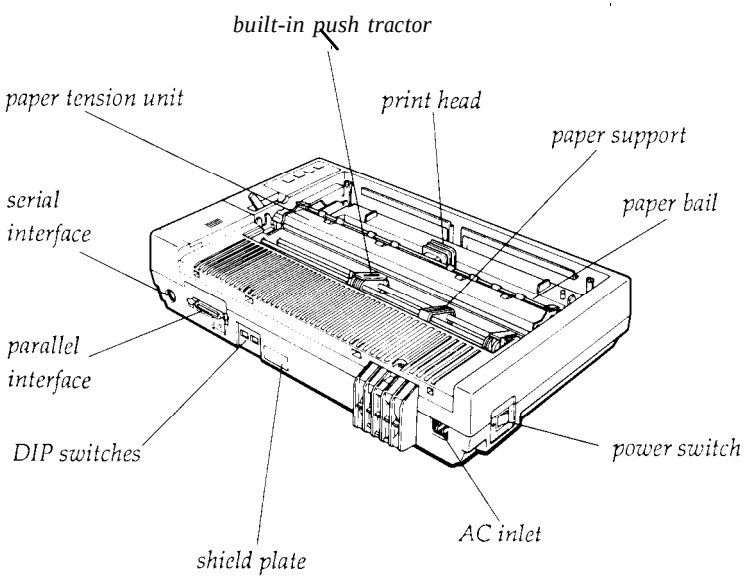
SW	Description	ON	OFF
1-1	International character set and Graphics character set*	See table 1, 4 (Pages 3-8 and 3-9)	
1-2			
1-3			
1-4	Character table	Graphics	Italics
1-5	Print direction for graphics	Unidir.	Bidir.
1-6	Super Draft	OFF	ON
1-7	Cut sheet feeder mode	ON	OFF
1-8	Skip over perforation	ON	OFF

DIP Switch 2

SW	Description	ON	OFF
2-1	Page length selection	See table 5 (Page 3-9)	
2-2			
2-3	Interface type/parity	See table 2 (Page 3-8)	
2-4			
2-5	Baud rate	See table 3 (Page 3-9)	
2-6			
2-7	Short tear-off mode	ON	OFF
2-8	Auto line feed	ON	OFF

. You can select an international character set when DIP switch 1-4 is OFF, or select a graphics character set when DIP switch 1-4 is ON.


edge guides
paper guide
paper rest
font compartment cover
paper release lever
platen knob
paper guide cover
printer cover unit
printer cover
control panel


built-in push tractor
paper tension unit
print head
paper support
paper bail
serial interface
parallel interface
DIP switches
power switch
AC inlet
shield plate

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